# RSH 2 - Nutrient-medium gleyic fir with oak (CHS 47)

| STAND TYPE (PT) **471** | | | |
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| | Present status | | |
| | A - target | B - transitional | C - distant |
| **SHARE [ha]** | | | |
| **SHARE [%]** | | | |
| **ROTATION [yrs]** | irrelevant | 100 | 80 |
| **REGENERATION PERIOD [yrs]** | continuous | 30 | 30 |
| **BEGINNING OF REGENERATION** | irrelevant | 81 | 61 |
| **SILVICULTURAL SYSTEM** | V | pN, (pP) | pN, (pH) |
| **MANAGEMENT FORM** | High forest | | |
| **PERIOD FOR PLANTATION ESTABLISHEMENT [yrs]** | 7 | | |
| **SUPERORDINATE MANAGEMENT UNIT** | BE (NS, SP, OK and mixed) target management for middle altitudes | | |
| **Target species composition for 47a subunit** | NS 20, SF 15, BE 10, OK 25, EL 10, SLI (NOM, SY) 10, WEM (EM, AH) 5, CAR (GAR) 3, GF 1, SBI (ASP, ROW, HBM, FM) 1 | | |
| **Target species composition for 47b subunit** | OK 30, NS 20, SF 20, SP 10, EL 8, BE (SLI) 4, CAR (GAR) 5, GF 2, SBI (ASP, ROW) 1 | | |
| **SILVICULTURAL PRESCRIPTIONS** | **Selection felling interventions according to criteria:**<br>• Sanitation selection – salvage felling at all growing stages.<br>• Support of quality and stability – to release quality crop trees including maintenance of accompanying species (NS, SF individually, OK or CAR as groups), in older parts prefer removal of low-quality competitors. | **Regeneration**<br>To prefer natural regeneration, large shelterwood cutting (or small one or small shelterwod cuttings ahead) should be done with uneven intensity. In total – 2 interventions per 10 yrs (removal amounts ca 5-yr increment of standing volume). To prefer removal of low-quality trees, to release canopy in order to initialise natural regeneration. In category „O“ (nutrient-medium gleyed soils) excessive canopy | **Regeneration**<br>One can begin the regeneration also earlier (in 60th yr of age) – where is a risk of rapid disintegration. When planning and conducting renewal cuts, take account of NS stand present on the site maximally. If instable (high h/d ratio, short live crown), the stand should be thinned less intensively with shorter period between the interventions, when clearcutting – use smaller cuts.<br>Group or group-edge cuts conduct where patches of natural regeneration (also around the individual |

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| | • Support and maintenance of target stand structure – adjustments based on comparison of current structure with model one.<br>• Harvest of „mature“ trees according to their development stage and management goals. Target diameter ranges between 40-60 cm. The removed trees are not only the thickest dominants, but also those ones, which will not perform well and which hamper a vertical canopy development.<br>• Intervention intensity (including salvage cut) in the context of total current increment accumulated following a previous intervention.<br>• Support of regeneration – to release locally, preferentially at sites where a vertical canopy is needed to develop (NS and SF individually or small patches, BE or SY in small groups). | opening is not desirable, due to the risk of subsequent weed development.<br>To combine a target-diameter felling approach (regeneration initiated), group fellings (growth and selfpruning) and thinning (more uniform structure stands in areas among the above-mentioned shelterwood parts).<br>In following phases, one should maintain the residual parent stand and postpone its presence on the site or alternatively leave it on the site with no final felling conducted. Artificial regeneration (including underplanting or undersowing) only for CDS species, which are missing (SF and BE). To initiate regeneration of SF ahead of time. Open areas from salvage cut can be used for artificial or combined (if they are present in the mother stand) regeneration of light-demanding trees (OK, CAR, alt. EM). On larger areas after salvage cut, leave SBI, ROW, ASP as preparatory trees for subsequent easier introduction of SF or BE.<br>**<u>Tending</u>**<br>***Plantations (underplanting, undersowing) and advanced growth***<br>• if sheltered by a parent stand (upper storey), to release accompanying species and conduct sanitation cut.<br>• if no shelter above, advanced growth should be cleaned (in NS also using a shrub cutter – schematic approach) supporting (even individually) accompanying species.<br>• in young stands with gaps (exceeding 0.04 ha), repair planting with crop species that are capable of stabilizing and soil-improving (OK, CAR) or support of pioneering species such as ROW, SBI and ASP.<br>***Stands younger than 40yrs***<br>Heavy thinning in NS focused on individual stability and maintenance of long live crowns | parents) of trees already exists – preferably BE, SF and SP, OK, SY, EL, which need more light). When releasing desirable undergrowth, remove NS from the upper storeys preferably.<br>Underplant SF (within the stand) and BE (inner strip), provided the parent stands are vigorous. Support all self-seeded desirable tree species.<br>In case of a rapid parent stand disintegration risk, support and rely on pioneering species (SP, ASP, SIB) and crop species regenerate below the preparatory stands.<br>Instable uniform overaged NS stands need to be qiuckly regenerated using a strip felling with narrow clearcuts on which light-demanding desirable trees are to be planted.<br>**<u>Tending</u>**<br>***Plantations (underplanting, undersowing) and advanced growth***<br>• if sheltered by a parent stand overstorey, release accompanying species and conduct a sanitation cut. Aditional regeneration of NS is not desirable. To release undergrowth more quickly compared to the B - transitional type (BE when dominants‘ height is 4 m, SY, alternatively AH when the height is 2 m).<br>• if not sheltered, the advance growth needs heavy cleaning (In NS also schematically – shrub cutter); all accompanying tree species should be supported maximally.<br>• gaps in plantations and advance growths (gaps larger than 0.04 ha) need a repair planting with stabilizers or soil-improvers (OK, CAM) and also self-seeded RW, SIB, ASP are beneficial.<br>***Stands younger than 40yrs***<br>If the first thinning is conducted appropriately (before top height 7 m) – follow the B-transitional type prescriptions. Emphasis on development of larger live crowns in accompanying species |

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| | | (beginning when top height is 5 m – 1.6 thousand trees are left on the site, second thinning when the dominants are 10 m tall – 1.2 thousand trees are left on the site. To release accompanying species at the expense of NS. In larger groups, an uneven thinning intensity is beneficial (mozaic following site conditions, health and share of valuable species); at the same time establish skidding lines in appropriate density (4-5 m wide lines 30 m apart).<br>***Stands older than 40 yrs***<br>To maintain (preferably locally) thinner canopy as crop trees (ca 300 per ha) are released from 1-2 competitors supporting natural regeneration (species from CDS) already after thinning. To support accompanying species in upper and lower storeys. The larger stand area the more emphasis is put on uneven canopy (alternating thinner and denser patches). Interval of interventions 5-10 yrs.<br>A gradual removal of NS that have reached the target diameters. Support of regeneration beginning of the other species such as SF (regenerated 10 yrs in advance before expected NS crop diameters are reached) and other species regenerated below the mature NS. | following the release cut. Uniform NS stands can be thinned also schematically.<br>If no thinning was conducted before top height 10 m or the density after slight thinning exceeds 1.4 thousand per ha, heavy thinning approach is not allowed any more. A light thinning from below consists in gradual removal of declining but still competing trees (high h/d ratio) – the intervention period 5-10 yrs. All other vigorous species than NS are beneficial.<br>***Stands older than 40 yrs***<br>If thinned appropriately (NS dominants show h/d 60-80 with live crown sharing at least 50% of the stem) – follow the prescriptions for B-transitional type. Emphasis on release cut (larger crowns expected) of the other trees, their support (also undergrowth) when thinned. Monospecific NS parts should not be thinned heavily in order to prevent weed infestation (on nutrient-medium soils) and restrict NS regeneration (20-30% can be tolerated).<br>The stands too dense with inappropriate h/d ratio should be thinned from below (labile understory), upper storey should be thinned slightly in periods 5-7 yrs. Gaps following salvage cut plant or regenerate naturally with desirable tree species. |
| **Measures in stands damaged by biotic and abiotic agents** | Thorough sanitation cut of trees infested by bark beetle.<br>**Stands damaged by game (bark browsing and peeling):**<br>The thickets – try to find at least 300 trees per ha in the upper storey, which show no and/or slight damage – these ones release (according to density) and protect individually in order to prevent damage, support every accompanying species, remove the most injured trees gradually, period of intervention no longer than 5 yrs.<br>In stand with logs – release minimally damaged crop trees, remove the most injured trees, support natural regeneration i gaps following a salvage-cutting or plant (also underplant) them with desirable tree species. Period of intervention no longer than 7 yrs.<br>**The stands manifesting decline (yellowing, defoliation etc.)**<br>The advance growths manifesting yellowing in more than 50% trees – do not use a schematic approach, focus on support of every healthy NS including the accompanying individuals. At top height 2 m, reduce a density to 4 thousand per ha – remove preferably the all-damage trees. Support all healthy NS trees regardless of the storey they thrive in. The gaps plant with desirable EL, DF, OK or leave them to SIB, ROW, ASP self-seeding. | | |

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| | The thickets and small-pole stands – if at least 1.4 thousand healthy NS trees are present, reduce the density to ca 1,5 thousand per ha at top height 5 m and continue to 1.1 thousand per ha when top height is 10 m. Remove all moribund and crooked trees, support all other desirable species. If less than 1.4 tree per ha are present on the site, support the healthiest 300-400 trees per ha, these ones release from the nearest competitors. The others leave without intervention excepting support of accompanying species.<br>As pole stage is achieved, thinning of declining NS stands is risky – threat of a sooner disintegration. If the stand contains a satisfactory share of accompanying species, support it maximally. Otherwise a sanitation cut and conversion are conducted. In case of a slower disintegration, all desirable tree species are underplanted and interplanted. |
| **Production safety** | (Non-evaluated) |
| **Production potential** | (Non-evaluated) |
| **Note** | Following sanitation cut, the period needed to establish plantations is allowed to be extended to 2+7, alternatively 5+5 yrs (depending on dispensation from state forest administration). |

| STAND TYPE (PT) **476** | | | |
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| | Present status | | |
| | A - target | B - transitional | C - distant |
| **SHARE [ha]** | | | |
| **SHARE [%]** | | | |
| **ROTATION [yrs]** | irrelevant | 120 | 100 |
| **REGENERATION PERIOD [yrs]** | continuous | 40 | 40 |
| **BEGINNING OF REGENERATION** | irrelevant | 101 | 81 |
| **SILVICULTURAL SYSTEM** | V | (p)P, (pN) | (p)P, (pN) |
| **MANAGEMENT FORM** | High forest | | |
| **PERIOD FOR PLANTATION ESTABLISHEMENT [yrs]** | 7 | | |
| **SUPERORDINATE MANAGEMENT UNIT** | BE (NS, SP, OK and mixed) target management at middle altitudes | | |
| **Target species composition for 47a subunit** | OK 18, BE 50, EL 9, SLI (NOM, SYM, FM, HBM, EM, WEM, AH) 10, SF (NS) 5, CAR (GAR) 5, GF 2, SBI (ASP, ROW, SP) 1 | | |
| **Target species composition for 47b subunit** | OK 50, SF 19, BE 10, EL 9, NS 5, SP 4, GF 2, SBI (ASP, ROW, CAR, GAR, SLI) 1 | | |
| **SILVICULTURAL PRESCRIPTIONS** | **Selection felling interventions according to criteria:**<br>• Sanitation cut in all growing stages.<br>• Support quality – in younger parts remove wolf trees and release quality trees including desirable group admixture, in older focus on crop trees.<br>• Support and maintain a target structure – alternating larger multi-age groups of desirable species. | **<u>Regeneration</u>**<br>Use 4-phase shelterwood cutting. Modify the stocking as follows: 8 – preparatory cutting, 6 – seed cutting, 3 – release cutting and finally remove shelter above 0.5 m high advance growth. Timing of phases 1 and 2 coincide with seed yrs. The number of phases can be lower depending on cutting rate. SF underplant as small groups. In the last phase, OK is allowed to be planted. Leave standards of desirable species. | **<u>Regeneration</u>**<br>Prioritize strip felling for faster regeneration and the possibility to more actively change the species composition towards CDS. Missing species (SF, SLI) by artificial regeneration in advanced groups or inner edges of the strips. For open areas of - light-demanding species of CDS (primarily OK).<br>Larger stands segment and prefer particular tree species in order to get a mosaic – mix of groups. Support self-seeded species. |

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| | • Harvest of „mature“ trees, group selection according to condition and management goals. The crop-log diameters 40-60 cm. In groups without BE adjust all interventions to needs of all species present on the site; remove undesirable competitors, which hamper development of vertical canopy.<br>• Intervention intensity (incl. salvage cut) based on total current increment accumulated following a previous intervention.<br>• Support of regeneration – release in larger groups (0-5 ha) when seed yrs are expected. | Stand should be appropriatelly segmented to differentiate desirable species composition.<br>**Tending**<br>***Plantations (underplanting, undersowing) and advanced growth***<br>• Remove wolf trees in BE advance growths and plantations.<br>• Where are gaps in juvenile stands (over 0.04 ha), conduct repair planting or support self-seeding of desirable stabilizers or soil improvers (EL, DF, OK or SY, SLI).<br>***Stands younger than 40 yrs***<br>Remove wolf trees at top height 5 m, negative approach in upper and main storey. Next intervention at top height 10 m in upper and main storey resulting in 6 thousand trees per ha. Simultaneously segment the stand by skidding lines appropriately (4 m wide lines 30 m apart). After 10 yrs when top height is 15 m, reduce density to 4-5 thousand trees per ha.<br>Further intervention at top height 20 m supports 300-400 crop trees per ha. No intervention in understorey.<br>***Stands older than 40yrs***<br>Continue releasing 130-200 crop trees per ha every 5-10 yrs. Support stand segmentation to get group mixture where BE is missing. | The wors parent BE stand, the quicker should be its regeneration – also prefer other desirable species.<br>**Tending**<br>***Plantations (underplanting, undersowing) and advanced growth***<br>• Remowe wolf trees in BE advance growths and plantations, support all other desirable species.<br>• Where are gaps in juvenile stands (over 0.04 ha), conduct repair planting or support self-seeding of desirable stabilizers or soil improvers (OK, SLI, EL, SY).<br>***Stands younger than 40 yrs***<br>Remove undesirable trees – support increment by reduced density. At top height 10 and 15 m, the density should be 5 and 3 thousand trees per ha, respectively.<br>Take care of at least 100 promising trees – release them from 1-2 competitors. Simultaneously segment the stand by skidding lines appropriately (4 m wide lines 30 m apart).<br>***Stands older than 40yrs***<br>Continue releasing crop trees (at least 50 per ha). Emphasise releasing accompanying species to promote larger live crowns and support their natural regeneration already during the last thinning. |
| **Measures in stands damaged by biotic and abiotic agents** | Support any accompanying species to prevent disintegration of forest stands over large areas. | | |
| **Production safety** | (Non-evaluated) | | |
| **Production potential** | (Non-evaluated) | | |
| **Note** | Following sanitation cut, the period needed to establish plantations is allowed to be extended to 2+7, alternatively 5+5 yrs (depending on dispensation from state forest administration). | | |