

A TYPE OF PEATLAND RECULTIVATION: PERENNIAL GRASSLANDS

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The scenario foresees the transformation of former peat extraction sites into agricultural land with perennial grassland that is regularly mown or grazed. The drainage system must be modified and maintained for the implementation of this scenario.

The purpose of real estate use - land on which the main economic activity is agriculture, type of land use - grassland.



Figure 1 Perennial grasslands (L.Kalniņa)



Figure 2 Perennial grasslands in Netherlands (L.Kalniņa)

Table 1 Conditions under which the recultivation scenario is possible

The type of the top peat layer	Transitional or fen type peat, thickness of the remaining transitional bog type peat <0.25m
Thickness of the remaining peat layer	< 0.5 m
pH values of the top peat layer used	5.0 - 7
Average groundwater level	Perennial herbaceous plants for hay 0.70-0.75m, perennial herbaceous plants for grazing 0.80-0.90m
Number of days per year when the area is flooded (days per year)	The area can be flooded seasonally; it cannot be constantly flooded.
Degree of peat decomposition	Medium and well-decomposed peat
Peat deposits coverage with stumps	< 3.0%

The most suitable for agricultural use are Fen (grass) mires, because their soils are rich in minerals, possibly with carbonates and nitrogen, they are less acidic (pH = 5.0-7.0). For the successful establishment of perennial grassland, the recommended topsoil type for the area to be recultivated is: - fen type peat with higher mineral content and potentially higher soil fertility, lower soil acidity. If the implementation of the relevant restoration type is planned at the peat extraction site, where peat extraction is stopped without the entire valuable peat layer being extracted, and the transitional mire type peat is found above the fen type peat, its recommended remaining thickness is preferably less than 0.25m, which as a result of agrotechnical work will mix with fen type peat to establish more favourable growth conditions for selected herbaceous plants.

The peat soils of the transitional mires are slightly acidic (pH4-5). If their pH is 4.0-4.3, depending on the requirements of the cultivating culture, they may have to be calcined. Perennial herbaceous plants are highly productive, relatively inadequate in terms of soil conditions. Many herbaceous plant species are suitable for growing in turfy, wet, flooded areas. The strong root system of herbaceous plants has a positive effect on soil quality, promotes the formation of persistent turf and binds carbon, preserving and increasing organic matter and preventing soil erosion. Herbaceous plants are energy efficient plants. Their cultivation requires relatively small amounts of equipment, no specialized equipment is needed, traditional agricultural machinery can be used for management.

The most important condition for the implementation of this recultivation type is a proper assessment of the hydrological conditions of the recultivation area. It is necessary to assess: the water inflow to the territory, the composition of sediments forming the bog's base, the technical condition of the drainage network of the peat extraction site (collecting ditches, runoffs) and the hydrotechnical structures (culverts) created on it, the state of the drainage system of the peat extraction site and its suitability for the planned land use.

The layout of the planned drainage system must be such as to guarantee the optimum air and humidity conditions for the cultivated herbaceous plants during their vegetation, and at different stages of their development. These conditions are achieved by planning the depth and spacing of the existing or rebuilt sediment ditches. When planning the placement of sediment ditches, the thickness of the remaining peat layer and the composition of the sediment under the peat should be taken into account. This will make it possible to determine the optimal depth and distance of the ditches or drains. By converting peat extraction sites into herbaceous plant areas, land drainage with drainage or open ditch network should be planned for land use. Planning the drainage of the site with an open ditch network will result in faster discharges of surface water from the area, capture of groundwater, lower installation and maintenance costs. When drying the area by installing a drainage system it is possible to achieve more even humidity conditions, ensuring unhindered movement of agricultural machinery, not occupying usable land areas, deeper plant roots in drained areas and the use of nutrients there, creating more homogeneous areas that facilitate grazing, herding, etc. One of the additional measures in planning herbaceous plant areas at peat extraction sites, where peat extraction has been discontinued is to determine the coverage of stumps on the peat layer. Peat extraction sites with a high coverage of stumps will be heavily burdened by the use of the area for intensive agricultural activity. Field evacuation, stump and root harvesting will have to be carried out, as well as the agrotechnical processing of difficult fields.

If necessary, field soil improvement and fertilization is carried out, which will ensure the necessary growth conditions for the selected plants.

GHG emissions

The impact on GHG emissions has been assessed for a 30-year period following the implementation of the scenario, assuming that the scenario is introduced in an area where peat extraction has been discontinued recently and ground vegetation has not yet emerged, but the topsoil is formed by fertile transitional and fen type peat. Following the implementation of the scenario, GHG emissions will increase by 8 tonnes CO₂ eq. ha⁻¹ per year compared to the initial situation. Total GHG emissions in this scenario over the calculation period correspond to 14.3 tonnes of CO₂ eq. ha⁻¹ per year.

Completion of restoration works

The requirements and technical solutions (restoration work) included in the extraction project for mineral resources or the restoration plan have been implemented in the territory, the peat extraction site is prepared for the planned land use after the completion of peat extraction. An act has been drawn up and signed in accordance with the procedures specified in regulatory enactments regarding completed restoration works.

By fulfilling these conditions, the peat extractor has, for his part, performed the tasks foreseen in the extraction project for mineral resources: to prepare the area for restoration - the site is ready for the cultivation of herbaceous plants. Further actions must be taken by the landowner.

Signs indicating that a restoration scenario has been implemented

The planned drainage system in the area to be restored has been created and it is capable of providing the optimal water - air regime in the soil for herbaceous plant cultivation and field treatment.

High quality perennial herbaceous plants have been formed in the area to be restored.



Figure 3 Perennial grasslands used for pasture (L.Kalniņa)

Economic use:

The area has been transformed after the implementation of the recultivation measures, it is included in organic soils and becomes an intensive agricultural area that gives further economic and social benefits.

Deficiencies

Perennial herbaceous plants are an area intensively used in agriculture and is a GHG emitter.



Latvijas Kūdras asociācija

