A range of measures are required to improve the state of threatened mire habitats

Since the previous assessment of threatened habitats in Finland, conducted ten years ago, our awareness of the importance of mires and of protecting mire habitats has increased. However, the recently completed second assessment shows that despite this progress the status of mires has not improved. The biodiversity of mire habitats continues to deteriorate especially in the southern and middle parts of Finland. The work to improve the state of mires can be intensified through various means.

Huidankeidas. Photo: Hannu Nousiainen

More than half of the mire habitat types are threatened – and their deterioration appears to continue

The evaluation covered 50 mire types, 54% of which were assessed threatened in the entire country, while a further 20% are Near Threatened. Of the 19 mire complex types assessed 63% were classified as threatened and 16% Near Threatened.

Forested mire site types, such as thin-peated pine mires, thin-peated spruce mires and *Vaccinium* spruce mires, were evaluated to have become more threatened since the previous assessment. The increased logging pressure was considered to be the main reason for this. Also, the wet and treeless rich flark fens as well as the flark fens of Southern Finland have become more threatened, because drainage and other land use activities in the catchment area disturbs their hydrology. It was estimated that the condition of the majority of mire habitat types will deteriorate in the near future.

Old, recurring and new threats

Drainage for forestry is the main reason for mire habitats being threatened – more than half of Finland's mires have already been drained for this purpose. In addition, agricultural use started to change mire habitats already centuries ago. Clearing mires for agriculture decreased for a while, but since the beginning of this century the amount of peatlands cleared into fields has again increased. Furthermore, logging has negatively affected the natural state of undrained, forested mires, particularly spruce mires. In addition, the construction of road networks, causing fragmentation of mire areas, as well as peat extraction and water engineering have had their impact.

Recent studies have shown that the long-distance effects of old drainage and ditch maintenance cause more severe deterioration in the wettest mires than was realised ten years ago. Even some undrained mires can dry out due to certain land use activities in their catchment areas, which causes changes in the mire ecosystem and their vegetation.

Mining is a growing threat, especially to Central Lapland's aapa mires and rich fens. In addition, peat moss has begun to attract commercial interest as a growth medium, for example. The extent, location and regulation of such land-use will determine the severity of their impact on mires.

It is estimated that global warming has already had an impact on the characteristics of palsa mires and frost bogs, and will have an effect in the future on the frost-affected characteristics of northern reticulate raised bogs and northern boreal aapa mires. Furthermore, climate change is expected to have an even greater effect on mires in the long term.

Safeguarding the remaining undrained mires is important

In order to improve the state of mires, these habitats must be protected and restored, and land-use in catchment areas must be carefully planned. Many of the measures that will improve the condition of mires will also improve the state of inland waters as well as protect and increase the carbon storage in mires.

The local permafrost created peat mounds with permanent frozen core, palsas, in the mires of the northernmost Lapland, but these have begun to thaw due to global warming. A collapsing palsa in Inari's Perumämmärinjänkä in summer 2018. Photo Rauno Ruuhijärvi.

More financial resources for nature conservation and more marketing of conservation for landowners is needed as well as mire restoration, both within and outside protected areas. One of the operating models found to be cost-effective in the restoration of mires is to direct water from drainage areas to drying aapa mires.

In addition, undrained mire areas and mire networks should also be maintained outside of the conservation areas through land use planning and other regulation means. Peatland forestry can be developed in a way that allows for the areas' natural values to receive more attention, for example using continuous cover forestry in suitable habitats.

Aerial images were utilised in the assessment of mire complexes. The new and more widely available aerial and satellite images and laser scanning, as well as other remote sensing datasets and GIS analyses, provide new means of studying and monitoring the state of mire habitats.

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Although *Vaccinium* spruce mires are classified as Endangered (EN), there is an increasing logging pressure falling upon also the pristine sites. Photo: Seppo Tuominen.

Especially fine examples of rich birch fens occur in Central Lapland, in the same area where several mining companies have also shown interest. Photo Timo Penttilä.