Restoration Possibilities of Valuable Natural Habitats

Dr Paweł Nicia, Assoc. Prof. *e-mail: rrnicia@cyf-kr.edu.pl,* Dr Romualda Bejger, Dr Maria Sterzyńska, D.Sc., Assoc. Prof., Dr Paweł Zadrożny, Assoc. Prof., Prof. Dr Piotr Parzych

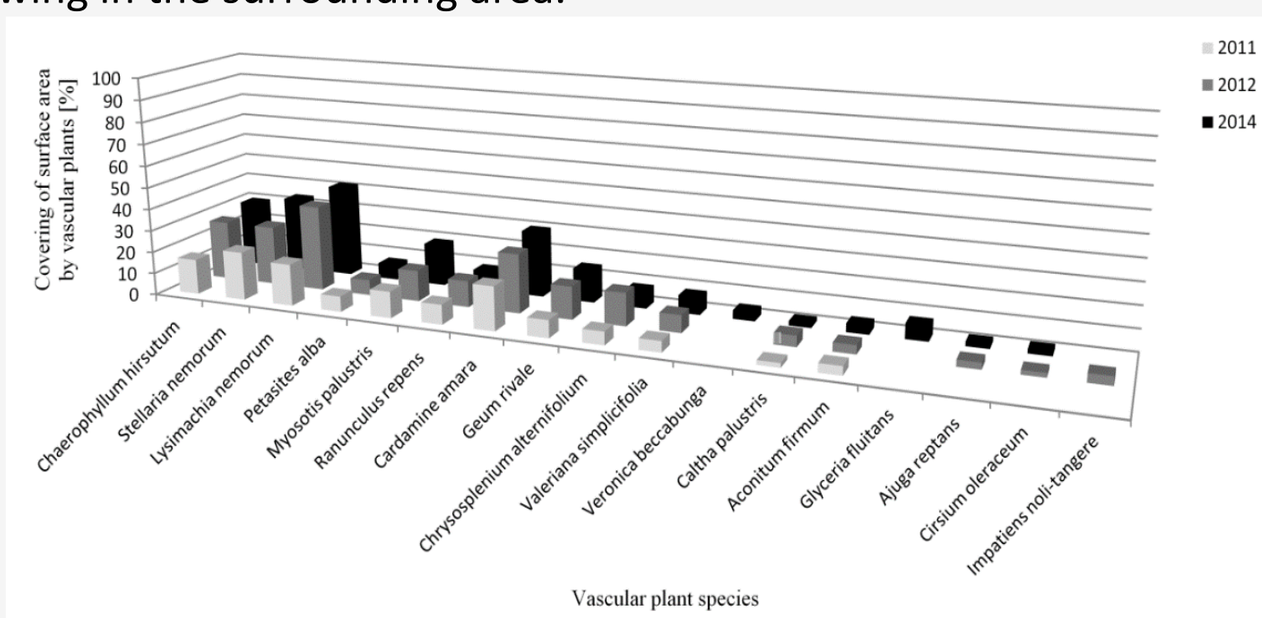
Restoration is a well-known and commonly used active and/or passive protection procedure that is aimed at restoring the original habitat conditions. The choice of restoration methods is closely related to the properties and conditions in a given habitat. The scope of activities carried out as part of the restoration procedure is selected in such a way so as to intervene in the natural environment as little as possible and bring the best results. However, practice shows that it is possible to undertake restoration activities at low costs and with positive effects that are visible in a relatively short time. The restoration of valuable hydrogenic habitats, such as the mountain fens of the Caltho-Alnetum community in the Babia Góra massif is a great example here.

The performed restoration activities proved that with minimal intervention in the environment, with the use of natural local materials or the application of extensive forms of utilisation, the condition of these habitats was improved, the degradation processes were stopped and their natural functioning was restored.

Usually, during hydrogenic habitat restoration processes, a system of gates made of materials such as concrete and wood is installed in drainage ditches in order to restore the original groundwater level. In this case, a different solution was selected. Since the mountain fens of the *Caltho-Alnetum* community were protected, the gradual obstruction of the outflow of water from the restored habitats was carried out with the use of available local material - wood from dead trees planted in the 1960s and 1970s on the mountain fens. Most frequently, these were partially rotten trunks and branches of ash and spruce that died in these habitats. In this way, makeshift gates were made. Trunks and branches in drainage ditches slowed down the flow of water and caused their gradual silting. In order to effectively block the outflow of water, it was important to select the appropriate number of such gates. Their number depended on e.g. the topography and the depth of the drainage ditches. In areas with a steeper slope, in habitats drained by ditches 0.8 m deep, the gates were made densely, at distances of about 0.7 to 1 m. In the case of mountain fens located in an almost flat terrain, the distances between the gates were even 3 to 4 meters. Trunks and branches alone would not seal the drainage ditches sufficiently. In the autumn, the gates installed in the drainage ditches were effectively sealed with a significant amount of leaves from beech trees growing in the surrounding area.

Groundwater level depth measured from the soil surface mean value of the three research plots [m]			
2011	2013	2014	2018
0,41	0,19	0,17	0,15

The effectiveness of the performed passive restoration activities was so high that the increase in the groundwater level in the restored habitats was noticeable after only a few weeks.



Raising the groundwater level also caused statistically significant changes in the chemical properties of soils in these habitats, e.g. raising the pH value and increasing the organic carbon content [Nicia et al. 2018, 2018]. Raising the groundwater level changed the habitat conditions, which translated into the gradual appearance of the plant species characteristic for this habitat

Conclusions

Based on the research carried out in 2010-2018, it can be concluded that the described method of restoration of mountain fens of the Caltho-Alnetum community:

- does not intervene excessively in the natural environment thanks to the use of only natural materials such as trunks and branches of dead trees for the assembly of the gates,
- is cost-efficient and easy to implement - the material used to assemble the gates was obtained from the restored habitats, there was no need to transport these materials to hard-to-reach places in the mountains,
- limits the degradation of other valuable natural habitats in the vicinity due to the fact that passive restoration was carried out without removing the top layer of moorsh,
- is highly effective - a positive response from the restored habitats was observed just a few months after the start of the restoration processes.

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