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Eurasian perspectives on the role of kurgans in the conservation and restoration of steppe vegetation

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Steppe is among the most endangered biomes of the world, especially in Europe, where more than 90% of original steppes have been destroyed due to conversion into croplands, afforestation and other human activities. Because of the socio-economic changes of the past centuries, steppe vegetation is now often restricted to places inadequate for ploughing, such as ancient burial mounds called kurgans. Thus, beside that kurgans are millennia-old iconic historical monuments of the steppic landscape, they are vital in preserving both our cultural and natural heritage. We collected and synthesised existing knowledge on kurgans by a review of research papers and grey literature and provided recommendations for elaborating the involvement of kurgans into agri-environmental schemes. We found that the proportions of kurgans covered by steppe vegetation increase from west to east and from lowlands to uplands. Despite their small size, kurgans act as biodiversity hotspots and harbour many red-listed plant species. High biodiversity is maintained by a pronounced fine-scale environmental heterogeneity provided by the special micro-topography of the kurgans. We found that landscape-level land use changes such as intensified agriculture and construction works are the major threatening factors for biodiversity of kurgans. Despite the vital role of kurgans in sustaining steppe vegetation, we identified serious knowledge gaps on their distribution, vegetation, flora and fauna and their potential role in steppe restoration. We conclude that these sacral places play a crucial role in preserving steppe vegetation, especially in intensively used agricultural landscapes in the western part of the steppe zone. They maintain ecosystem functions at the landscape-level by providing refugia for rare grassland specialist species and ensuring habitat connectivity in anthropogenic landscapes. Based on our results we suggest improving existing agri-environmental schemes which only focus on the preservation of the landforms. By applying a new operative habitat restoration approach several additional goals could be achieved such as restoration of ecosystem functions and services and the involvement of the society in nature conservation.