



Large herbivores as geomorphic agents: insights from a systematic review and meta-analysis

Grace Moore¹, Gemma Harvey², Tim Newbold³, and Alex Henshaw⁴

¹Queen Mary University of London, Geography, London, United Kingdom (g.v.moore@qmul.ac.uk)

²Queen Mary University of London, Geography, London, United Kingdom (g.l.harvey@qmul.ac.uk)

³University College London, Genetics, Evolution & Environment, London, United Kingdom (t.newbold@ucl.ac.uk)

⁴Queen Mary University of London, Geography, London, United Kingdom (a.henshaw@qmul.ac.uk)

Large herbivores acting as ‘ecosystem engineers’ (e.g. pigs, deer, cattle, bison, ponies) have diverse effects on geophysical and ecological systems and are increasingly being incorporated in landscape restoration and rewilding projects through species (re)introductions. Through their physical behaviours such as trampling, grazing, wallowing and rooting, large herbivores can alter soil properties, vegetation structure and hydrological processes, contributing to landscape-scale changes. Despite their growing inclusion in rewilding projects, particularly in temperate regions, the geomorphic impacts of large herbivores remain poorly understood.

This systematic review and meta-analysis aims to synthesise the evidence base on the geomorphic impacts of large herbivores in rewilding and other environmental settings and identify the nature and magnitude of their impacts. Using systematic searches of Scopus and Web of Knowledge, 13,733 studies were initially identified and screened down to 461 studies for full-text review. Studies meeting key inclusion criteria (terrestrial environments, temperate biomes, relevant to rewilding settings) were retained for synthesis and meta-analysis of effect sizes. The presentation will explore the evidence base in terms of geographic distribution of studies across species, ecosystems and countries and identify key gaps. Through meta-analysis of effect sizes, it will explore the directionality and magnitude of large herbivore effects on key geomorphic processes across a range of environments relevant to rewilding. These findings provide new insights into the role of animals in shaping ecosystems.