

*“This study highlights how in-depth understanding can be gained about the opportunities and barriers for maintenance of green infrastructures. Recommendations about conservation targets regarding patterns and processes in social-ecological systems, and landscape stewardship for biodiversity and ecosystem services, are commonly based on knowledge built on a narrow range of contexts. Single disciplines, limited ranges of biophysical and cultural settings, or particular societal sectors, are characteristic. This implies that research designs can affect the results.*

*Our review focuses on a selection of research topics studied using multiple landscapes as case studies that employ research designs built on the Pan-European variation in environmental histories defined by biophysical, anthropogenic and cultural dimensions. Pattern is illustrated by different kinds of “forest loss” and dead wood as biodiversity state indicators; process is illustrated by trophic cascades linked to predator-prey interactions affecting forest and wetland biodiversity; landscape stewardship is illustrated by meeting places enhancing social capital, and land ownership cultures.*

*The six examples reviewed clearly indicate that the design of research matters for the conclusion that can be drawn. First, regarding pattern...*

- It is critical to differ between deforestation and temporary canopy loss caused by forestry and natural disturbances, and both can lead to counter-intuitive losses as well as gains of biodiversity. Indeed, historical deforestation created valuable biocultural landscapes, and even temporary canopy loss can reduce habitat quality over repeated logging cycles.*
- The volume, type and decay stage of standing and lying dead wood are good forest history indicators. Because restoration efforts are uncertain, costly and time consuming, it is urgent to maintain dead wood in both remnants of cultural woodlands and intact forest landscapes. Sampling in such remnants and in intensively managed systems can be used to identify conservation targets.*

*Second, concerning process...*

- Loss of large carnivores can allow increasing large herbivore numbers that reduces the regeneration and abundance of certain tree species, which threatens species dependent on them. Research designs with narrow ranges of variation underestimate the role of such trophic cascades.*
- Land use intensification favours generalist predators, which increases predation on ground-nesting birds. To secure sufficient variation of landscape contexts, macroecological research designs are needed.*

*Finally, regarding landscape stewardship...*

- The portfolios of traditional, new and virtual fora for collaboration and maintenance of social capital vary with regional cultural contexts across the European continent. Virtual fora dominate and can enhance social capital, but can increase the emergence of “fake news” and spiteful debate.*
- Including data from both the European continent’s West dominated by private land ownership and post-communist East with state ownership reveal dramatic differences in people’s beliefs, political cultures, and the quality of government. Development of landscape stewardship approaches therefore need to be adapted to regional contexts.*

*We conclude that research designs addressing green infrastructure functionality through the lenses of macroecology and comparative politics should be aware of the variability of independent variables caused by the choice of regional contexts in terms of landscape history trajectories and governance. Diverse continents, like the Pan-European area, form laboratories for knowledge production about biophysical, anthropogenic and cultural aspects of sustainable landscapes. We advocate the expansion of integrative knowledge production and learning towards functional green infrastructures using place-based approaches that draw upon multiple methods and scales.”*