

Defragmenting the Swedish landscape - From landscape analysis to the construction of fauna passages

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The Swedish Transport Administration (STA) is developing environmental quality goals for a sustainable infrastructure among which permeability and safety for wildlife are recognized targets. To meet these goals, mitigation efforts must be optimized. Standard measures such as fauna passages and exclusion fences are usually costly and their effect may be rather local. Conventional non-wildlife crossings are numerous but less effective. Alternative measures may provide cheaper complementation but are still under development. The main question is hence where and when additional mitigation is necessary to achieve a safe and permeable infrastructure. We developed a set of evaluation criteria based on previous studies on ungulate-vehicle collisions, barrier effects and passage use. We then applied these criteria to the Swedish roads and railroads and identified potential deficiencies in permeability that in turn provide input to the nationwide mitigation plan of the STA. Our approach contained multiple steps: 1) We mapped potential infrastructure barriers based mainly on traffic and design characteristics combined with transport safety policy and planned infrastructure upgrades. 2) We evaluated existing conventional crossing structures with respect to their probable use by wildlife and estimated their remedying effect on the identified barriers, combining passage efficacy with an area-effect. 3) We identified the remaining, i.e. unresolved barriers and evaluated the need and feasibility for mitigation measures in dependence of regional and local terrain features and in dialogue with managers, engineers and landowners. 4) We further discuss which mitigation options should be favored locally with respect to traffic safety, landscape, wildlife management and economic constraints. In our studies, we focus on the GIS work and its fundamental assumptions based on empirical studies, important practical simplifications and implementation constraints that enforce pragmatic results.