Coupling species distribution and connectivity modelling at the population level in a dynamic industrial environment for conservation planning

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Résumé

Artificialization of habitats and soils is one of the principal causes of biodiversity loss (IPBES, 2019). A major regulatory tool to limit artificialization impacts is the mitigation hierarchy sequence used in environmental assessment studies. However, several weaknesses have been identified concerning mitigation hierarchy processes: avoidance of impacts is neglected to privilege overuse of offsetting and mostly applied in a project-by-project approach without scaling up (Bigard et al., 2017). As such, a comprehensive vision of land-use changes should be considered at scales relevant to population functional ecology and should integrate cumulative anthropogenic pressures. Here we investigate the potential impacts of alternate schemes of development of an industrial site on a population of the endangered ocellated lizard (Timon lepidus). The industrial site, which covers 900 ha, is frequently under building and land management projects, and at the same time intertwined with natural habitats favorable to the ocellated lizard. We used species distribution modelling (SDM) to identify at a very fine resolution (5 meters) the urban and natural features affecting species occurrence. Subsequently, we used an individual-based spatially explicit model based on a stochastic movement simulator (Moulherat et al. 2020) to modelled landscape connectivity and population dynamics under different land management scenarios.

Mots-Clés: population ecology, functional ecology, landscape ecology, urban ecology, endangered species

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