Relationships between human activity and biodiversity in Europe at the national scale: spatial density of human activity as a core driver of biodversity erosion

Frédéric Gosselin*[1] and Jean-Marc Callois

[1]Ecosystèmes forestiers (UR EFNO) – Irstea, Institut national de recherche en sciences et technologies pour l'environnement et l'agriculture - IRSTEA (FRANCE) – Domaine des Barres, F-45290 Nogent-sur-Vernisson, France

Abstract

Many empirical studies have analyzed the relationship between human activity and the environment. Some of these have focused on the potentially negative impacts of human activity on the environment. Some others have tried to identify socio-political variables that could be at play in this relationship. Herein, we used well-adapted statistical methods to study the relationship between human activity and biodiversity in Europe at the country level; we worked with classical biodiversity indicators (two state indicators, two pressure indicators and one response indicator) on the one hand, and socio-economic variables on the other hand. We found strong relationships between economic variables and pressure indicators (related to soil sealing) as well as state indicators (related to the proportion of extinct and threatened species). However, there was no relationship between economic variables and the response indicator (related to the proportion of protected area). Though we did find significant relationships between some sociological variables and biodiversity indicators, the best models all included economic variables. These results cast a new light on an old issue: first, they reveal the pertinence of a set of variables related to the spatial density of human activity – either through economic growth or population levels; they also show that the impact of the spatial density of human activity on biodiversity indicators tends to decelerate – but not to decrease – as the spatial density of human activity increases; finally, since past and current levels of biodiversity erosion are best explained by the spatial density of human activity more than one century ago, they indicate that development of human activity may affect biodiversity after a long delay. These results reveal the need for further studies involving these metrics.

*Speaker