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Integrated Management of Invasive Geese Populations in an International Context: a Case Study

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Growing populations of geese exert a negative ecological, economic as well as social impact in Flanders and The Netherlands. These include invasive non-native Canada goose *Branta Canadensis* Linnaeus (Anseriformes: Anatidae), native greylag goose *Anser anser* Linnaeus (Anseriformes: Anatidae) and feral domestic goose *A. anserf. domestica*, among others. The EU funded project INVEXO focused on developing an integrated sustainable management in favour of both biodiversity, agriculture and the recreational sector. The approach combined efforts on prevention with ethical management methods and communication to different stakeholders and the public. Management intervened on reproduction (egg pricking) and on the number of birds (culling through moult captures and shooting). Measures were implemented opportunistically in space and time, resulting in a mixed, diffuse deployment throughout the area. The overall impact of the combined management effort was assessed by annual counts of the geese populations in the region using a fixed sample of counting areas. Trends in the average number of geese per municipality and per year were modelled using Generalised Estimating Equations. This showed a significant decrease in the number of Canada goose since the beginning of the project. It was unclear which population response (dispersion, reproduction) was responsible for this decline. When the province of east-flanders, where moult captures were applied most intensively, was considered separately, a significant yearly decrease was noted. Moreover, incorporating the number of Canada goose caught with moult captures as a fixed effect in the model showed an effect of caught numbers on modelled estimates. Although suggesting a link between moult captures and population numbers this approach would assume other management efforts to be evenly applied over the project area, which was not the case. Moreover the number of geese in the entire area hardly decreased in the last year. Recent research indicates that Canada geese disperse over large distances within Europe, blurring effects of a local action over the years. Future work will include dynamic population modelling, as well as thorough monitoring of geese populations as the basic elements of a sound adaptive management plan for geese in the region. This requires continuous dialogue between partners and stakeholders. In this respect, the Invexo project has provided a strong impulse.

Keywords: invasive alien species; Canada goose; damage; culling; moult captures.