Adaptive management of a large carnivore with Bayesian forecasting and state-space models

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Aim

Large carnivores are recovering in Europe, and their interactions with human activities increase consequently. In France, the wolf population is managed by harvesting animals annually for reducing livestock depredation. The management needs to be sustainable, evidence-based, and guided by science, and quotas have to be carefully justified and constantly adjusted to avoid damaging the wolf conservation status. In France, quotas are fixed every year based on population forecasts which rely on simple and robust population dynamics models. The aim of this work is to develop a model that will formally include harvest updates.

Methods

We will develop a Bayesian state-space model to support adaptive management of wolf harvesting in France. The model will data from the annual monitoring of wolf abundance based on capture-recapture data. We will use the model to predict the probability that the forecasted population size will be below or above the management objectives when subjected to different harvest quotas. The model presented here will inform decision makers about the policy risks of alternative harvest levels.

Expected results

The annual assessment of the wolf monitoring results, the use of forecasting models, and a threshold harvest approach to quota setting are expected to reduce the risk of wolf population sizes moving outside the desired goals.

References

Andrén et al 2020. Harvest models of small populations of a large carnivore using Bayesian forecasting. *Ecol App* 30:02063.
Duchamp et al 2017. Expertise collective scientifique sur la viabilité et le devenir de la population de loups en France.

Keywords

Bayesian theory. Large carnivores. Population dynamics. Population management. Statistical ecology.