



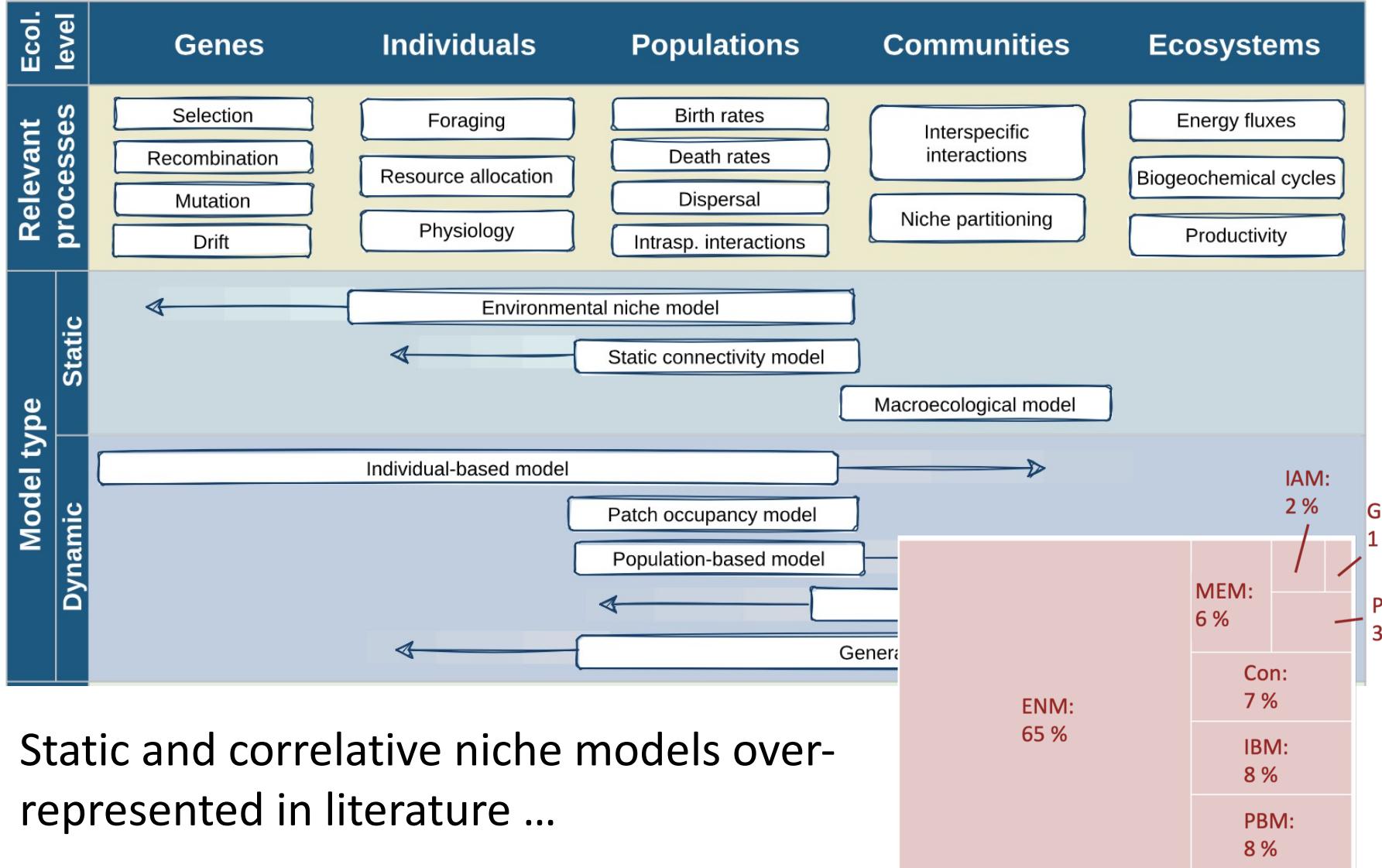
# Spatially explicit population modelling

Damaris Zurell, Anne Malchow

<https://damariszurell.github.io>

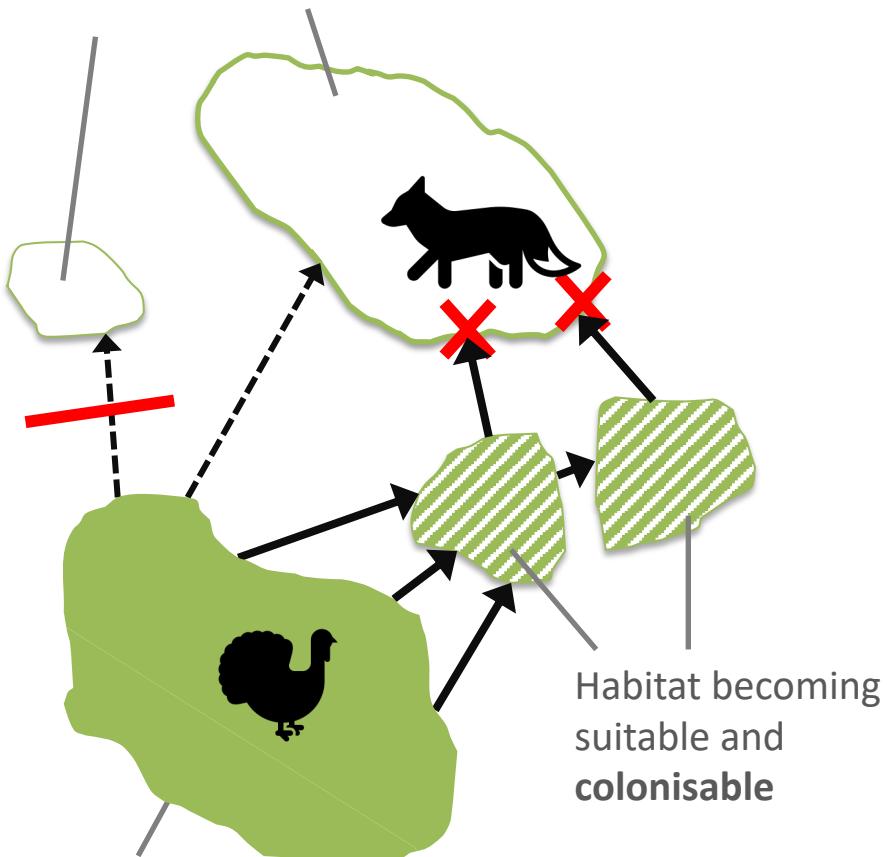


# Spatially explicit models in conservation



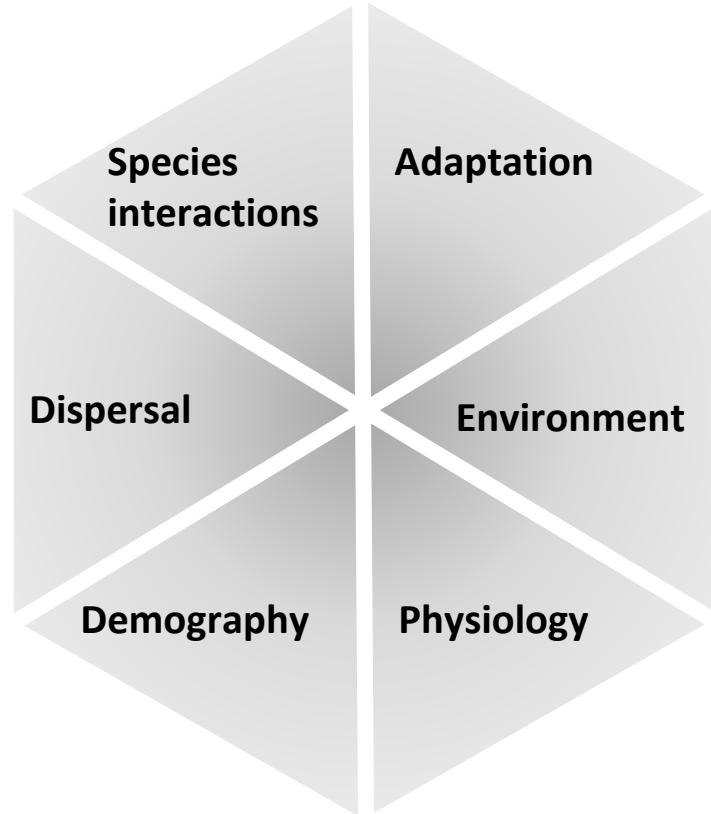
# Species respond dynamically to global change

Habitat becoming suitable but **not** colonisable



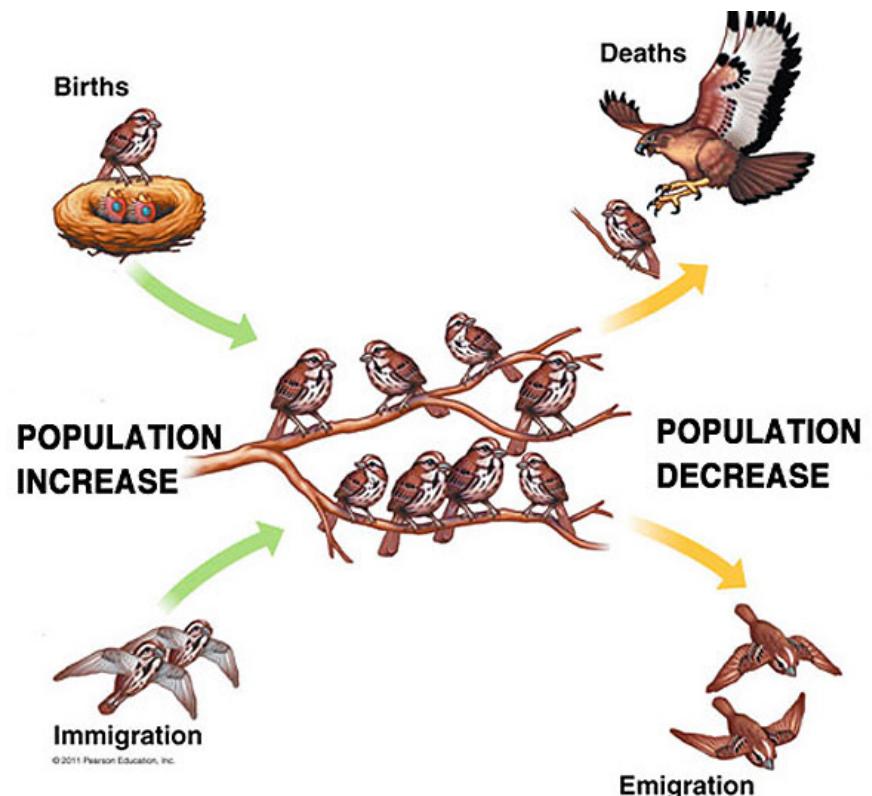
**Current distribution partly becoming unsuitable**

**Six key mechanisms for predicting biodiversity response:**



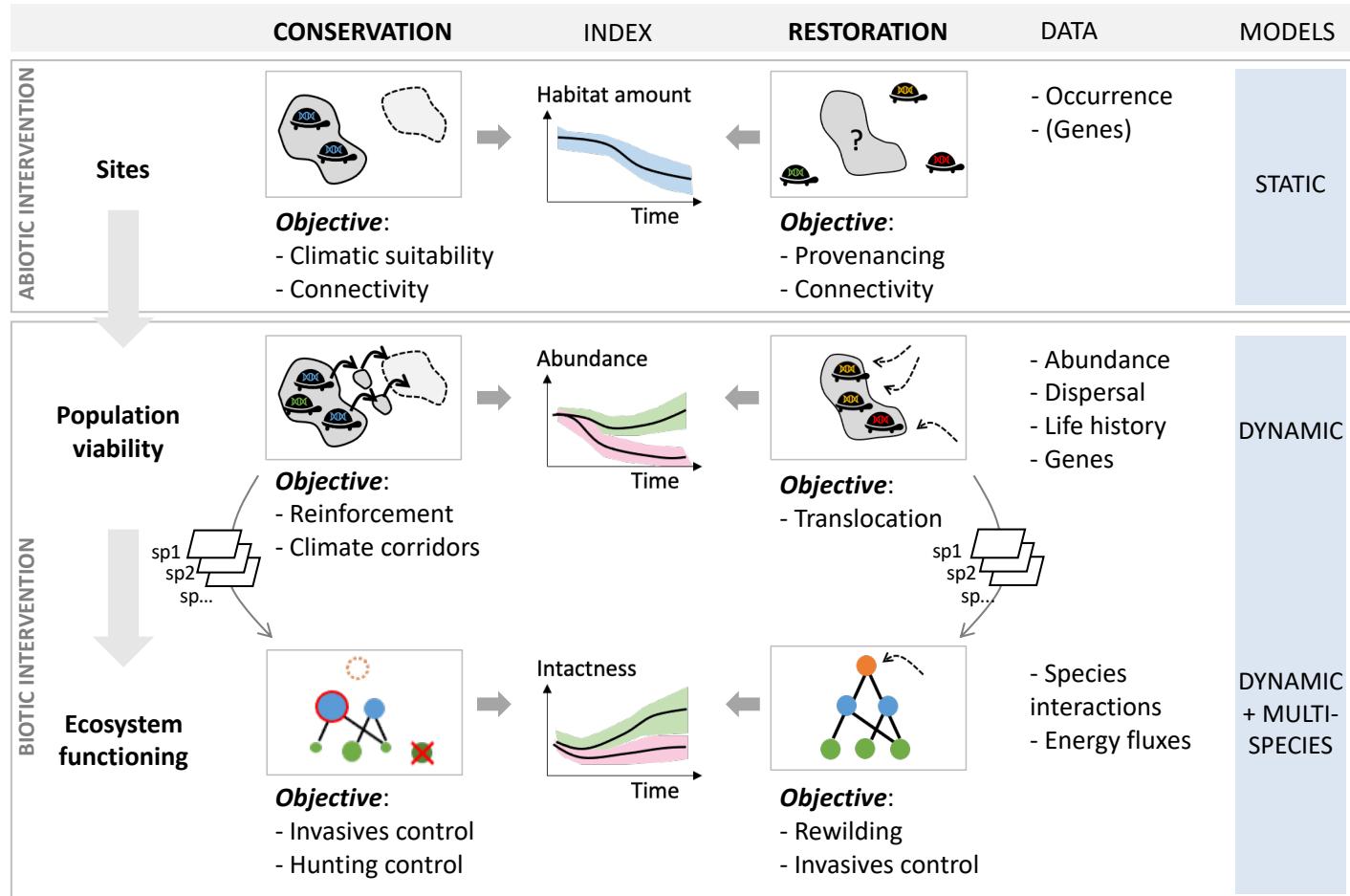
# Spatially explicit population models

- Provide a more process-explicit understanding, e.g.:
  - Which factors determine population dynamics and range margins?
  - How will fragmentation affect gene flow between populations?
  - How fast can species recover from population crashes or (re)colonise landscapes?
  - ...



# Spatially explicit population models

- Predict viability of populations, communities, and ecosystems
- Define temporally explicit conservation & restoration objectives

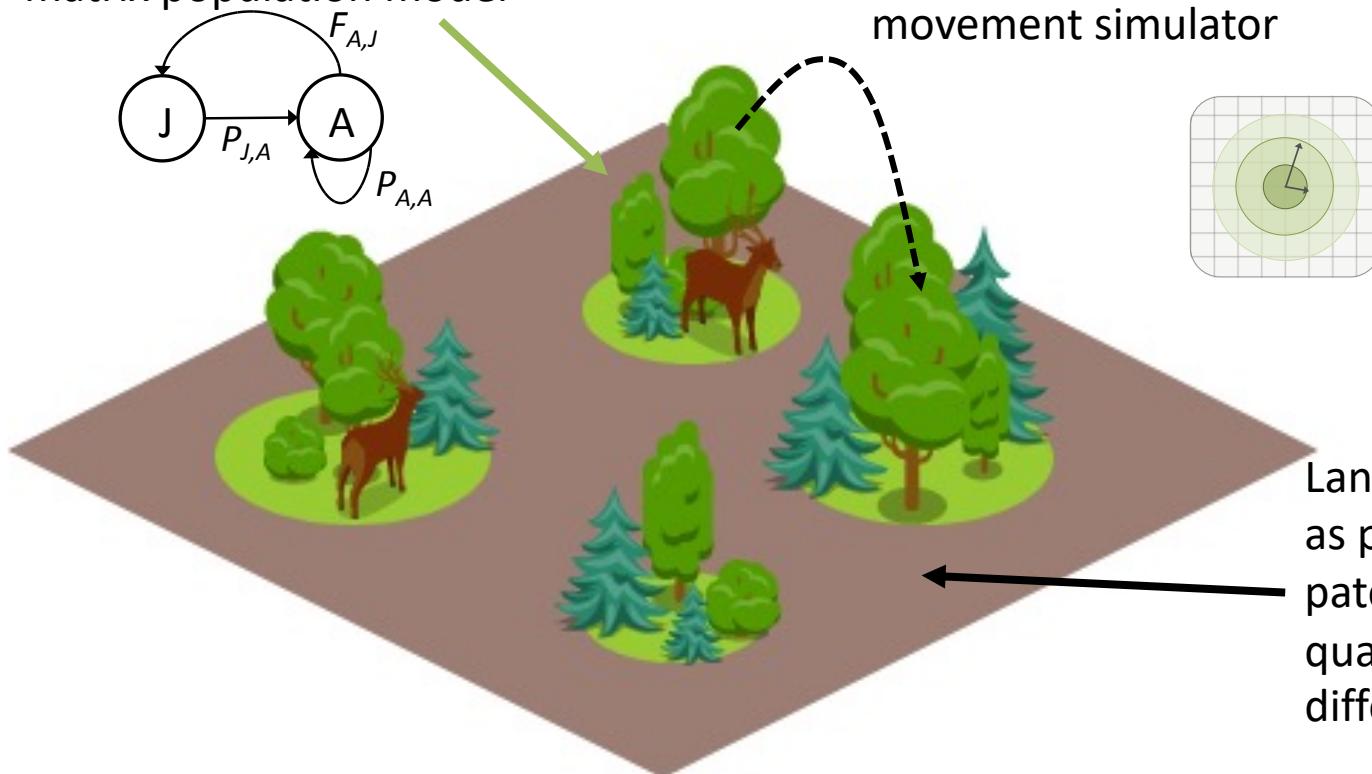


# Spatially explicit population models

- Simulating local population dynamics and dispersal

Local population dynamics described by population model, e.g. logistic growth or matrix population model

Dispersal described by dispersal kernel or movement simulator

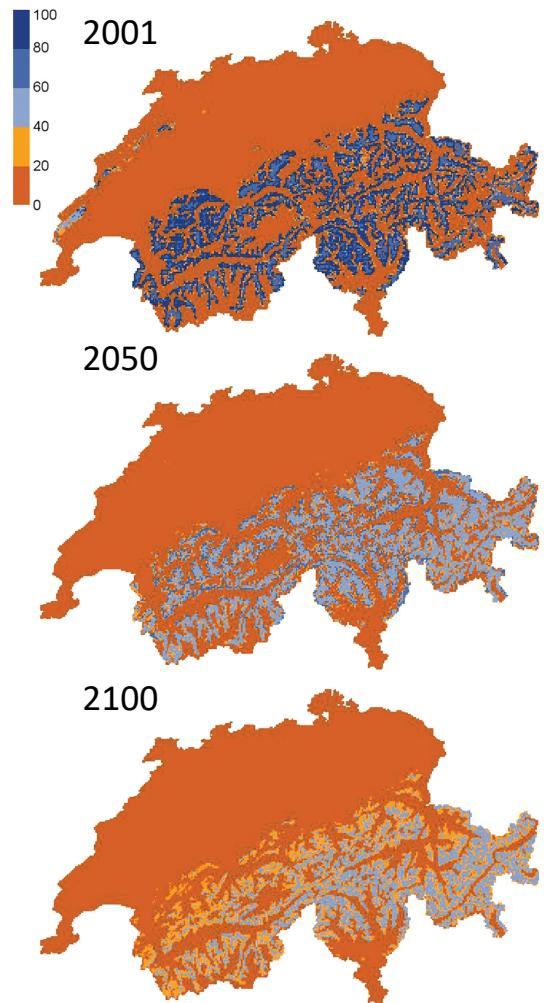
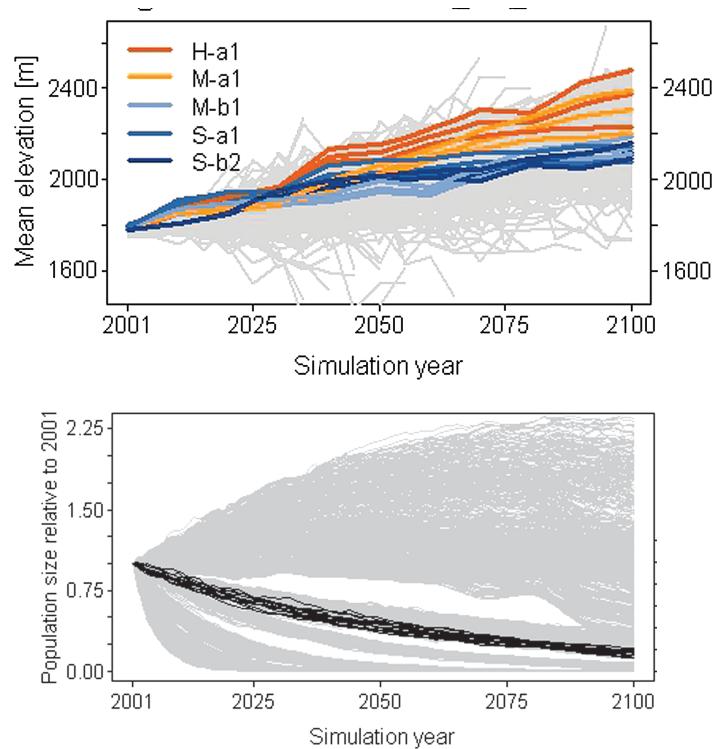


Landscape can be described as patch-matrix landscapes, patch types of different quality, of grid cells of different quality

# Spatially explicit population models

Example: black grouse in Switzerland

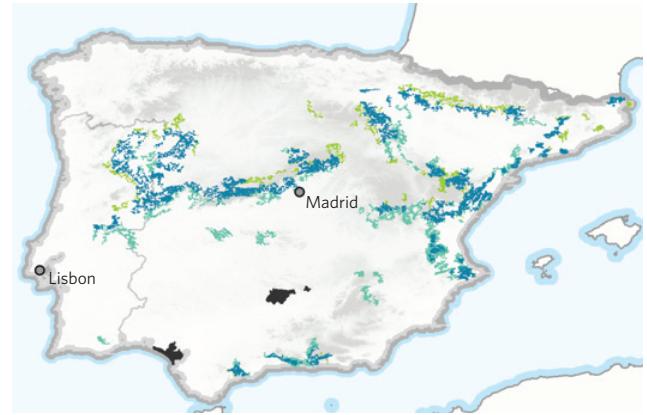
- Stage-structured model, individual-based movement decisions



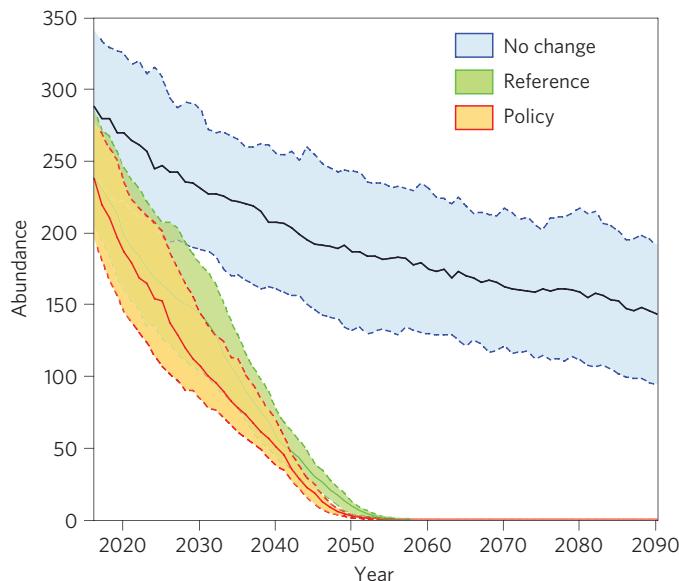
# Spatially explicit population models

Example: Iberian lynx

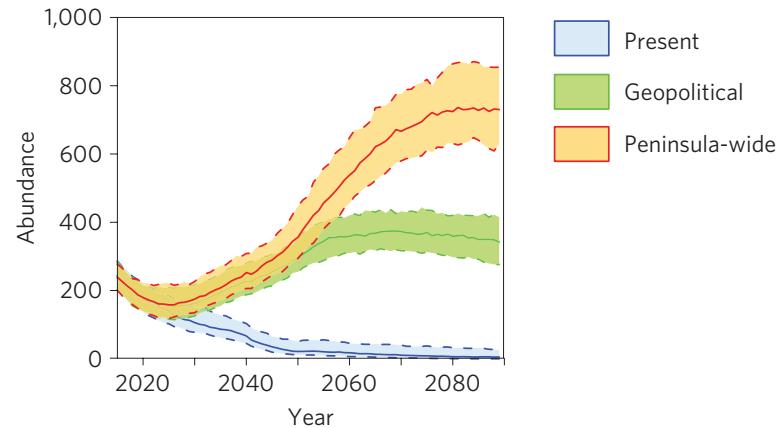
- Stage-structured model, dispersal kernel



Climate change:



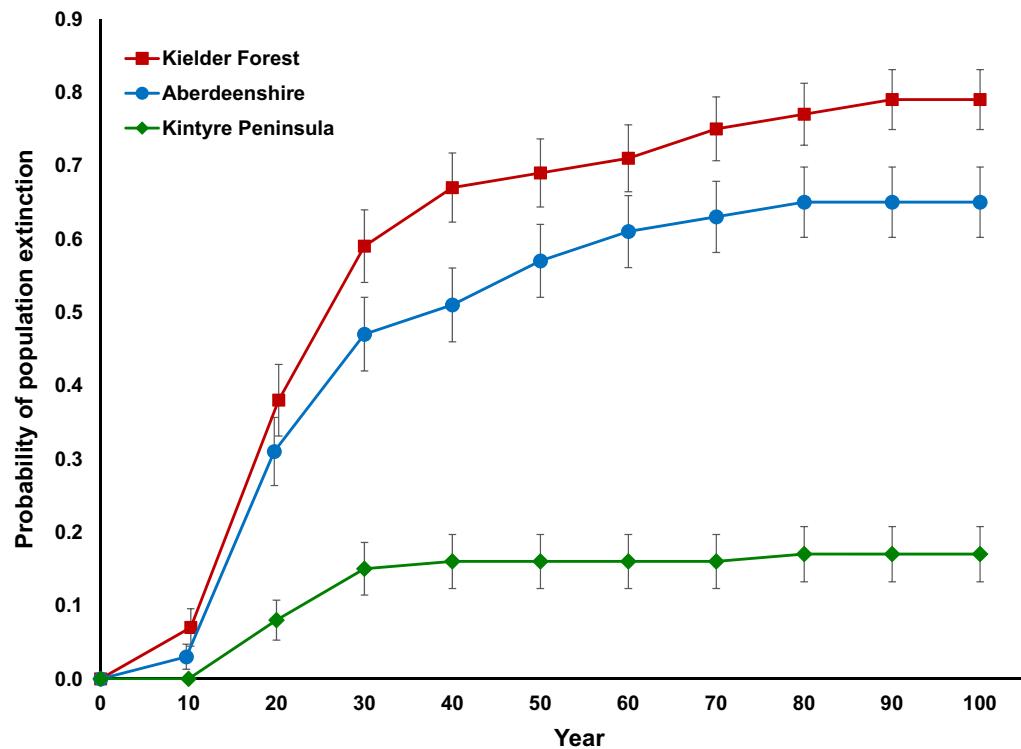
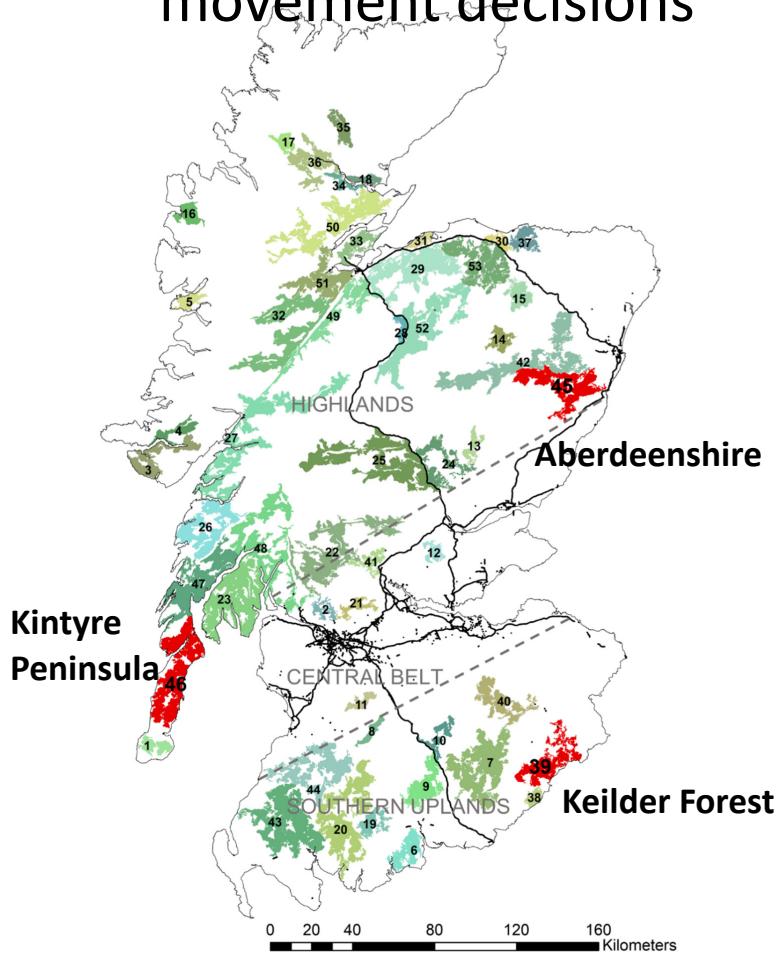
Management intervention:



# Spatially explicit population models

Example: Eurasian lynx, reintroduction Scotland

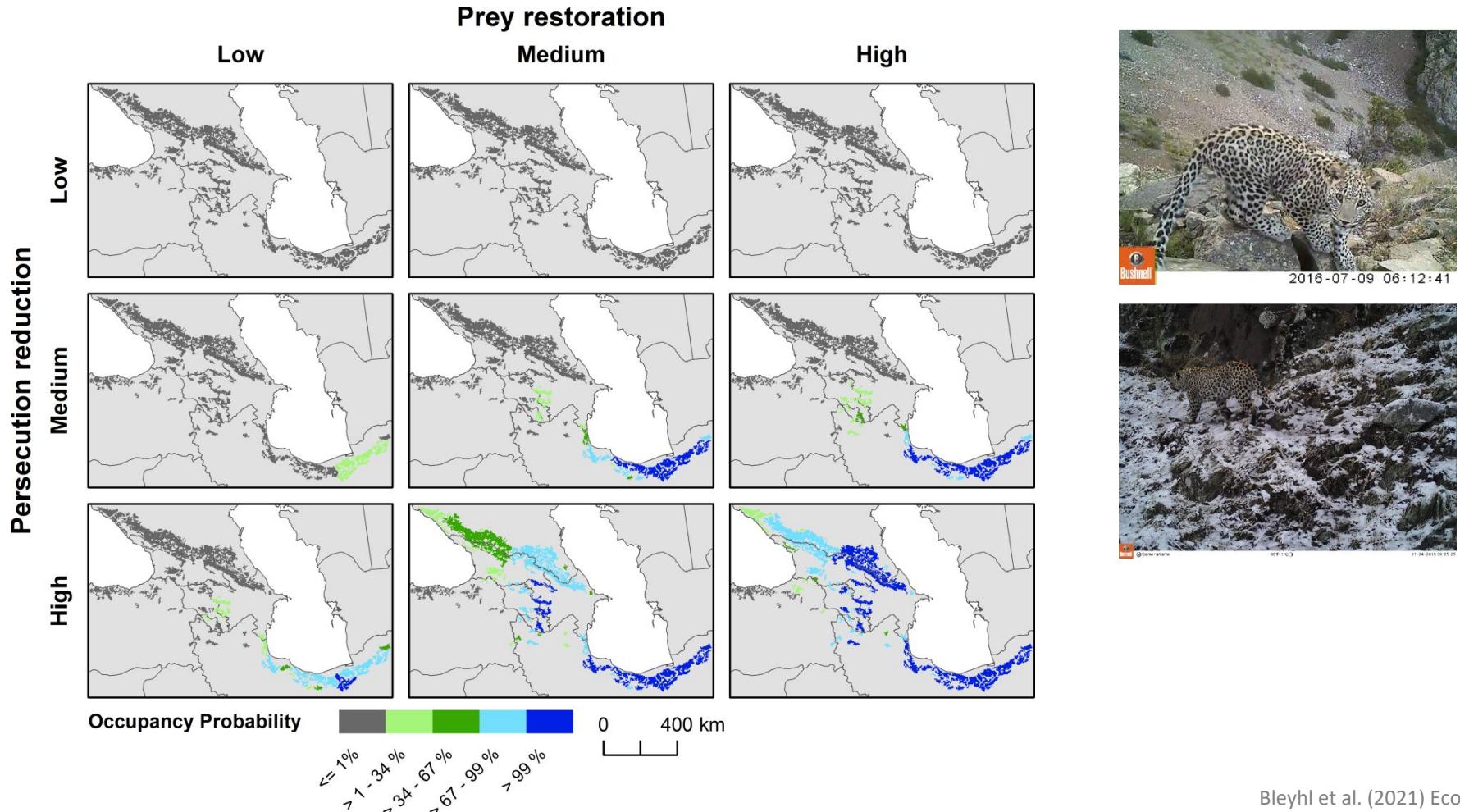
- Stage-structured model, individual-based movement decisions



# Spatially explicit population models

Example: Caucasian leopard

- Stage-structured model, individual-based movement decisions



# Thank you for your interest

## Contact:

**Damaris Zurell**

Ecology & Macroecology  
University of Potsdam

<https://damariszurell.github.io>

Email: [damaris.zurell@uni-potsdam.de](mailto:damaris.zurell@uni-potsdam.de)

