EFSA's Bird Flu Radar: behind the scenes

Henk Sierdsema (Sovon)
Stephen Baillie (BTO)
Gabriel Gargallo (ICO)

EBCC
European Bird Census Council

AUSVET

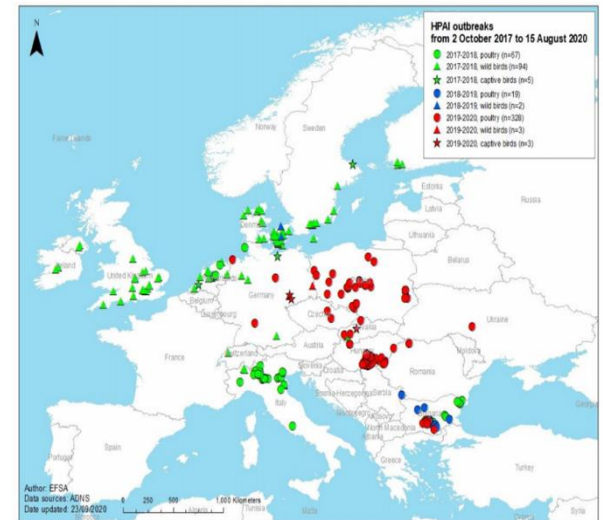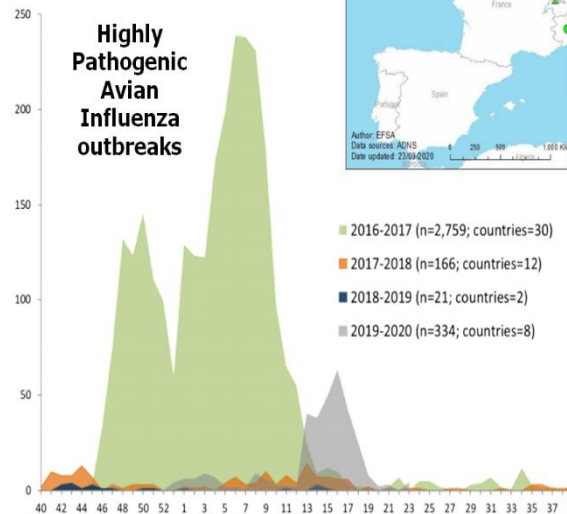ICO

BTO

Sovon

Provision of a pilot project to develop an Early Warning System for avian influenza

Key objective

To develop a spatiotemporal model to predict the risk of entry and establishment of HPAI in wild birds (pilot)

Contract NP/EFSA/ALPHA/2021/02

Models of relative bird abundance based on EBP data for 12 key species (including Russian data)

Canada Goose, Greylag Goose, Pink-footed Goose, Greater White-fronted Goose, Taiga/Tundra Bean Goose, Mute Swan, Whooper Swan, Eurasian Wigeon, Mallard, Eurasian Teal, Common Pochard and Tufted Duck

11/01/2022

Models of bird movements (long-distance & local) based on EURING data for the same 12 key species

11/01/2022

Development of a spatiotemporal risk assessment model of HP avian influenza introduction and establishment in Europe based on EBP and EURING model outputs + other risk parameters

11/05/2022

Global consultancy specialized in veterinary epidemiology

Introduction: avian influenza

- High pathogenicity avian influenza (HPAI) is a threat to domestic poultry

- Wild birds play some role in HPAI transmission between poultry flocks, particularly over long distances

- Useful to be able to predict locations of outbreaks, in order to pre-emptively boost biosecurity there

Introduction: European bird movements

- EURING databank allows understanding of European bird movements

- Migration Mapping Tool maps movements for 50 species

- Can we use EURING data to predict the spread of HPAI?
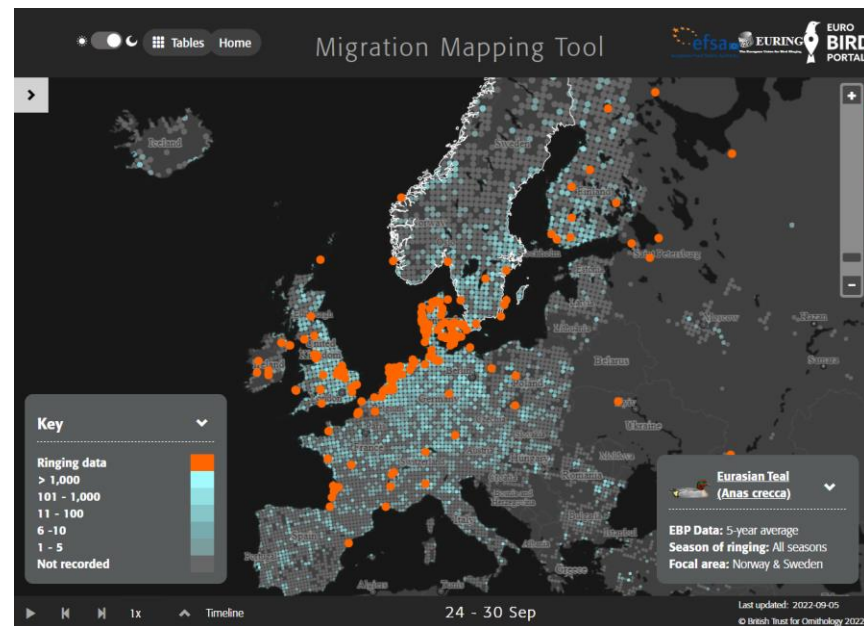
app.bto.org/mmt

Introduction: HPAI early warning system

European Food Safety Authority (EFSA) project:

use risk-mapping to develop prototype early warning system for HPAI in the EU

Model outline

Use EuroBirdPortal data to estimate distribution
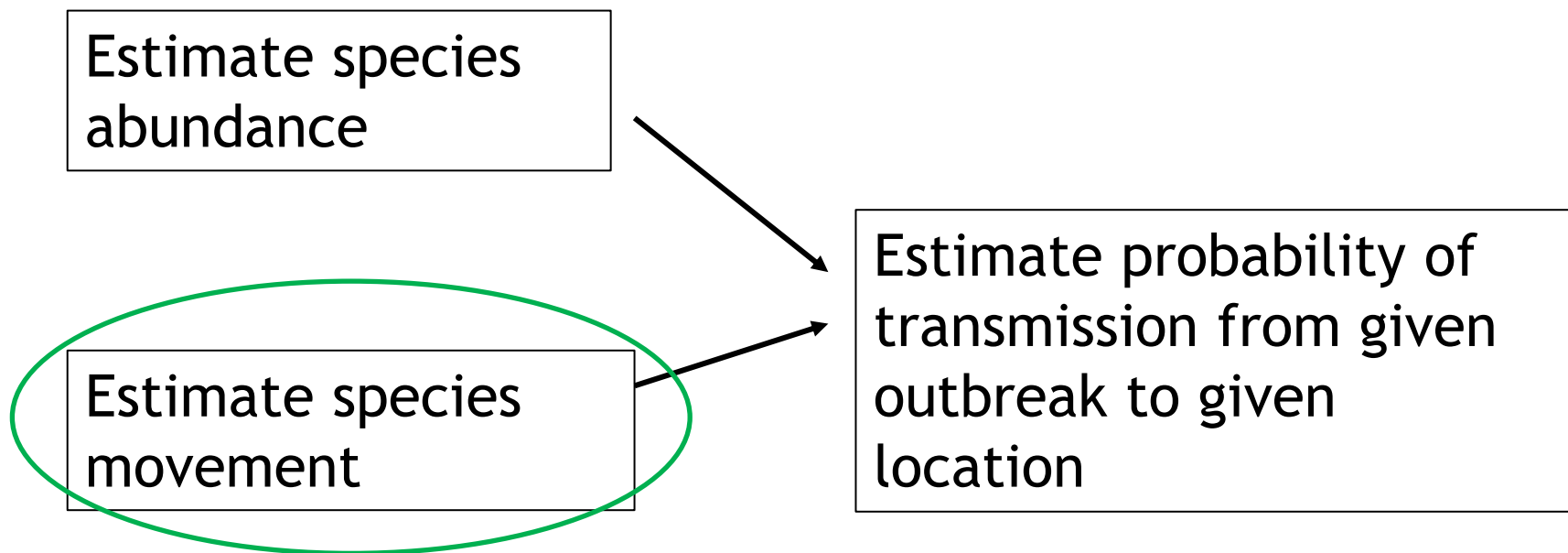- for 12 wildfowl species (2 swan spp, 5 goose spp, 5 duck spp)

Estimate species abundance
(Sovon)

Estimate species movement
(BTO)

Estimate probability of transmission from given outbreak to given location
(Ausvet)

Model outline

Estimate species abundance

Estimate species movement

Estimate probability of transmission from given outbreak to given location

Use EURING data to estimate movement parameters
- for 12 wildfowl species (2 swan spp, 5 goose spp, 5 duck spp)
- 12 species account for 89% of European ring recovery data for waterfowl
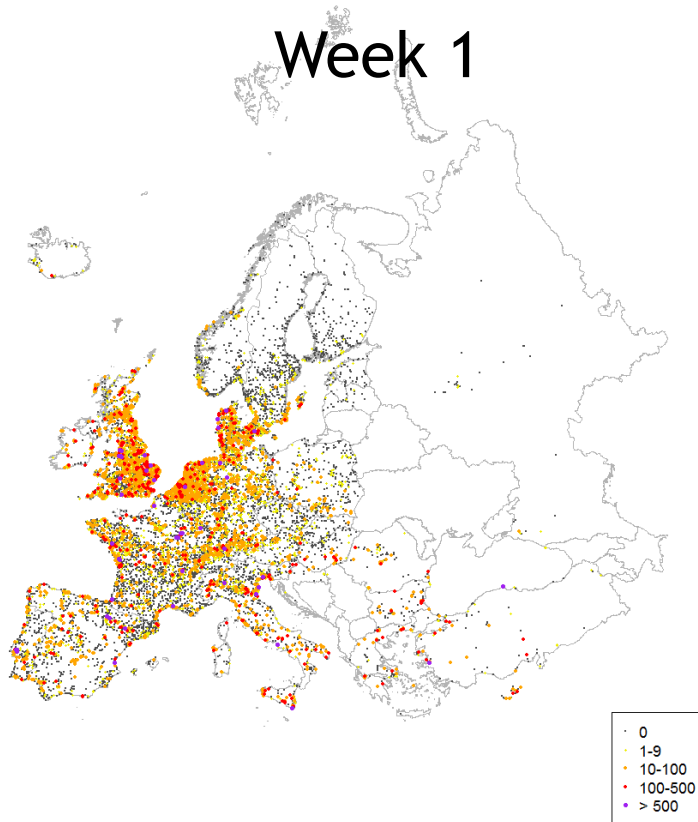
Species abundance
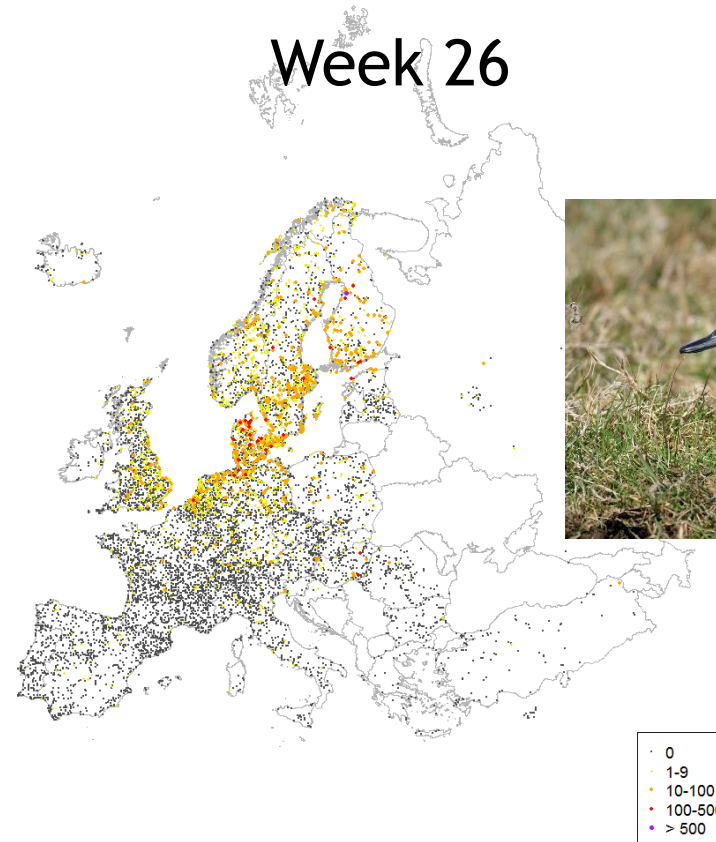
- Main data source: EuroBirdPortal

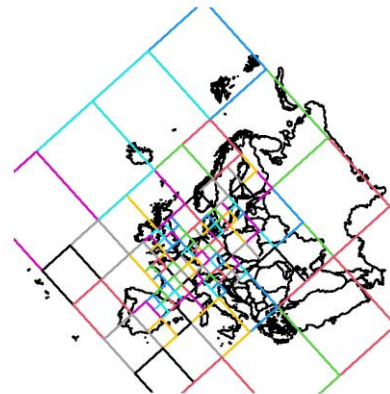Mark Zekhuis – freenatureimages.eu

Weekly observation maps

Week 1

Week 26

Saxifraga-Piet Munsterman
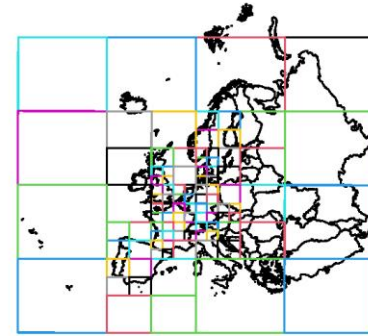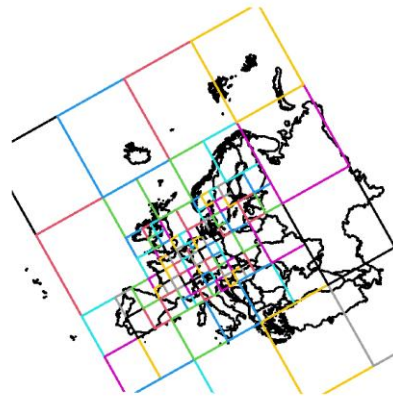
·	0
·	1-9
·	10-100
·	100-500
·	> 500

·	0
·	1-9
·	10-100
·	100-500
·	> 500

Spatial modelling with AdaSTEM-models
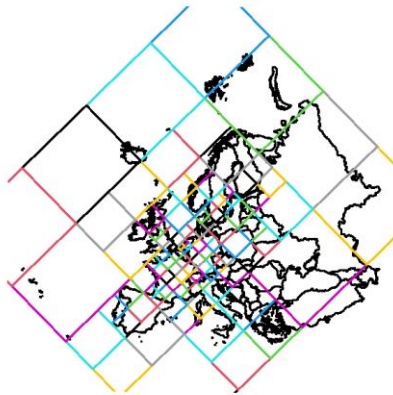
Weekly abundance predictions

Eurasian Teal

Saxifraga-Jan Nijendijk
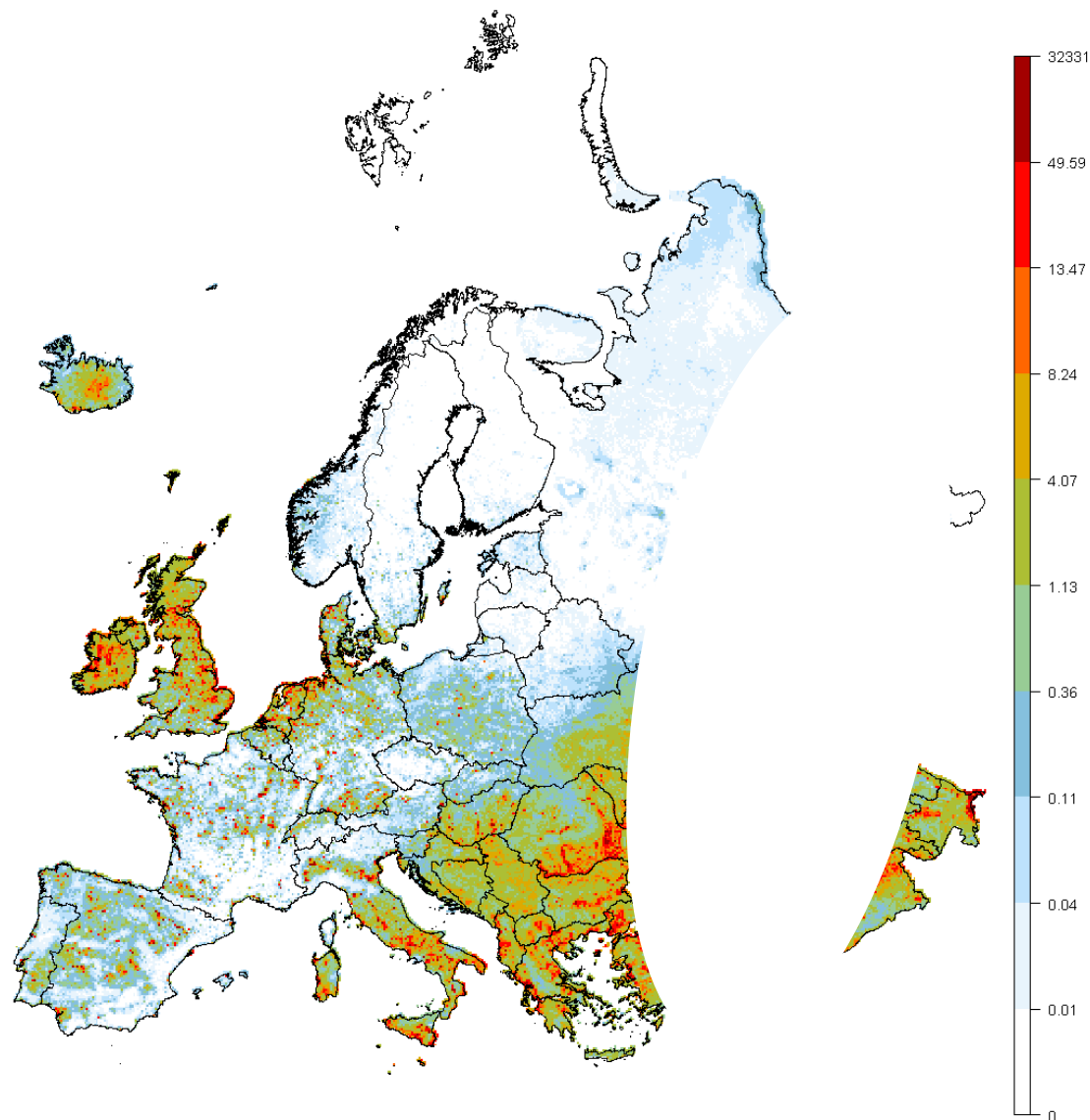
Eurasian Teal - week 1

Weekly abundance predictions

Bean Goose

Saxifraga - Piet Munsterman

Bean Goose - week 1
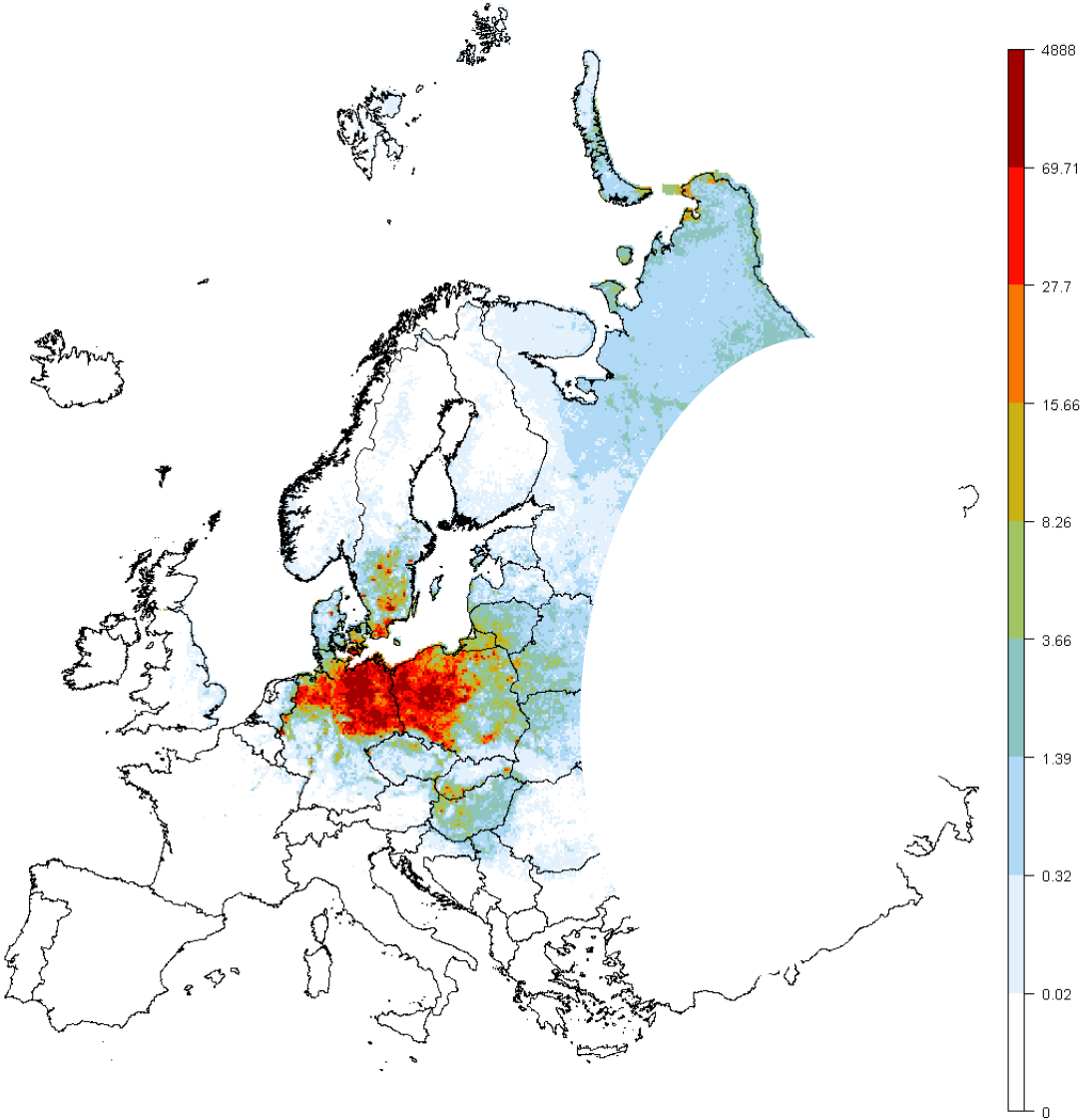
Movements

- Long distance movement

  - **Between-month** migration and cold-weather movements

  - Target parameter: proportion of birds moving between areas of Europe between months

- Local movement

  - **Within-season**, short-distance (<200km) movements

  - Target parameter: probability of moving a given distance
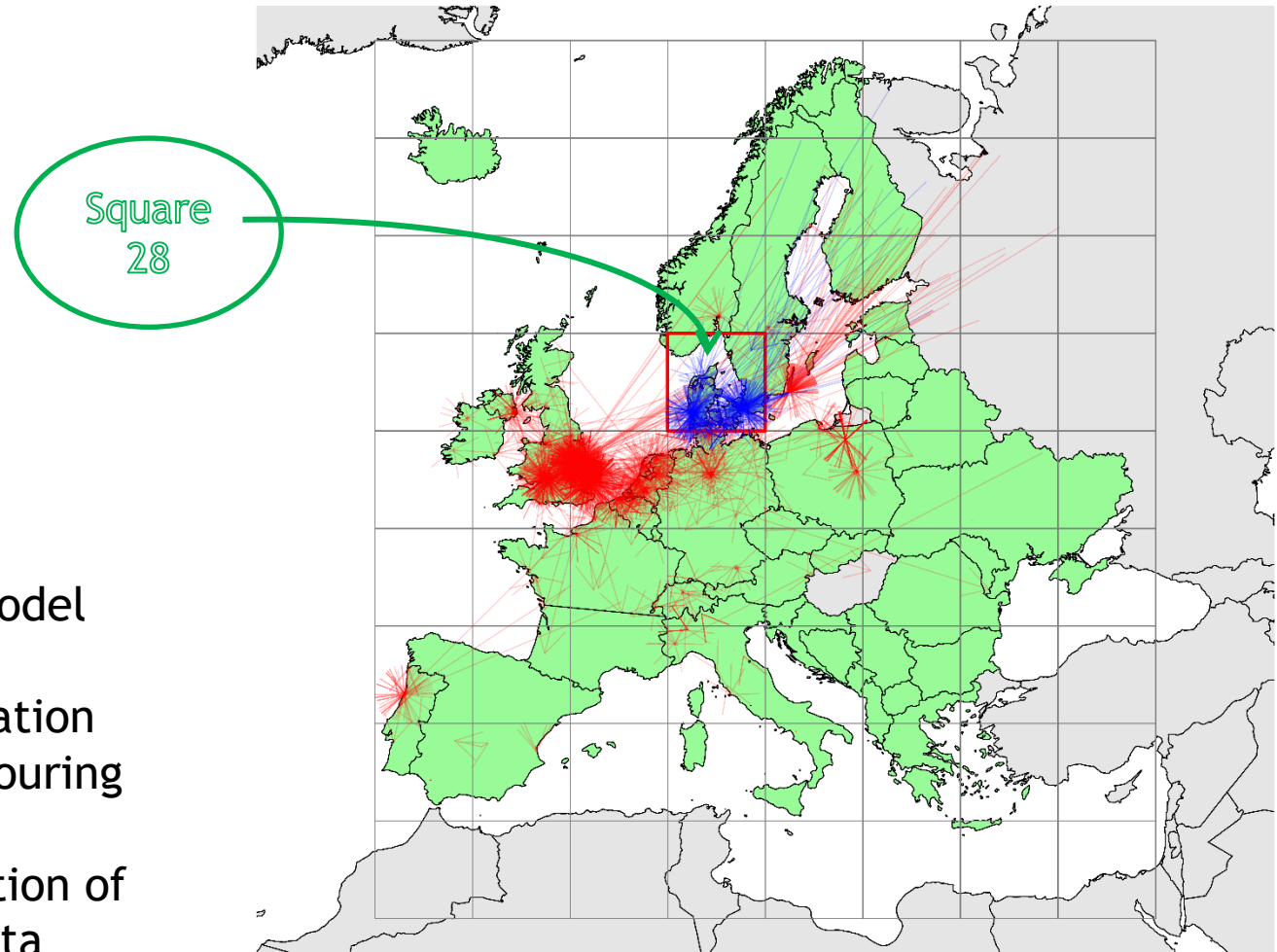
Sovon

Methods: long-distance movements

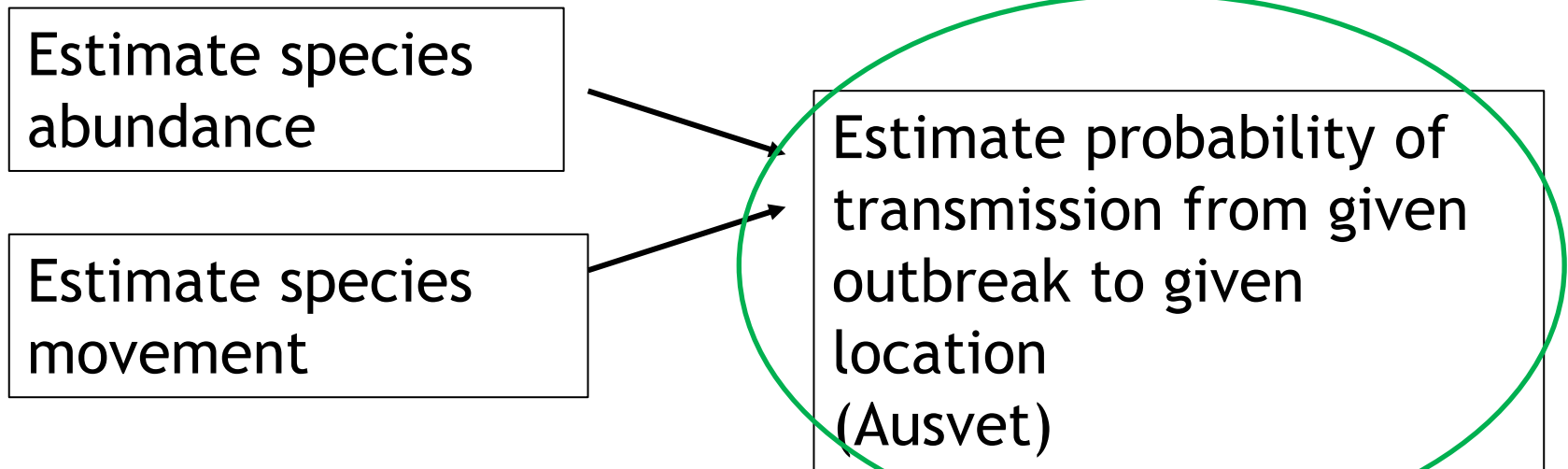- ## All Mallard movements, September to October
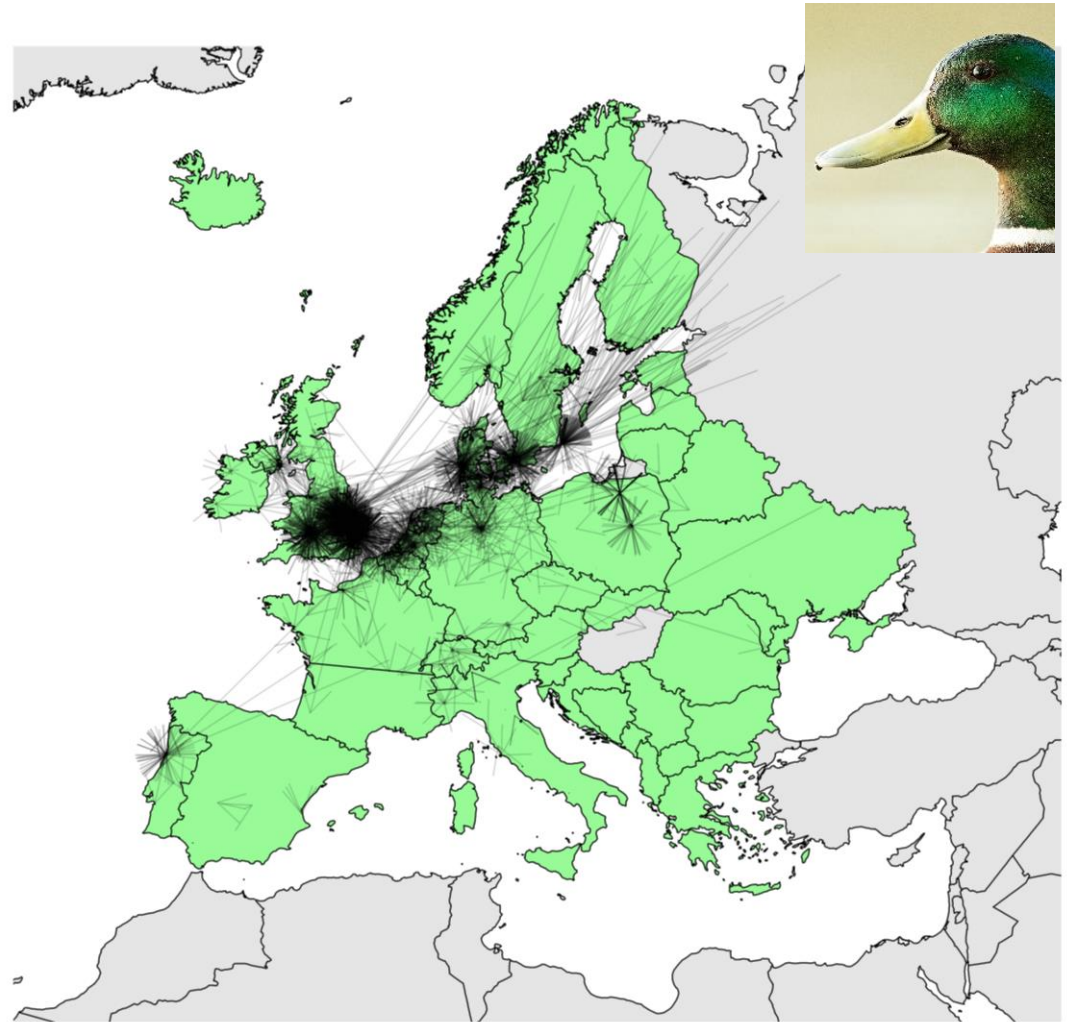
Methods: long-distance movements

Which mallards move to square 28 in October?

- Bayesian spatial model fitted in INLA
  - Shares information among neighbouring cells
  - Allows estimation of p where no data

Square 28

Model outline

Estimate species abundance

Estimate species movement

Estimate probability of transmission from given outbreak to given location
(Ausvet)

Combine with known HPAI outbreaks

More information:

EXTERNAL SCIENTIFIC REPORT   AUSVET   ICO Institut Català d'Ornitologia   BTO Looking out for birds

Development of a prototype early warning system for avian influenza in the EU based on risk-mapping

G. Gargallo[1,2], J.G. Davies[3], C. Faverjon[4], C. Kampichler[5], S.R. Baillie[2,6,7], A. Cameron[4],

R.A. Robinson[6,7], H. Sierdsema[5]

https://www.efsa.europa.eu/en/supporting/pub/en-7762

Sovon