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A RISK INDEX TO EVALUATE AVIAN INFLUENZA VIRUSES INTRODUCTION BY WILD BIRDS

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We propose a risk index (**WRI**) that weights the risk of introduction of avian influenza viruses (**AIVs**), derived from wild waterfowl, into commercial poultry farms.

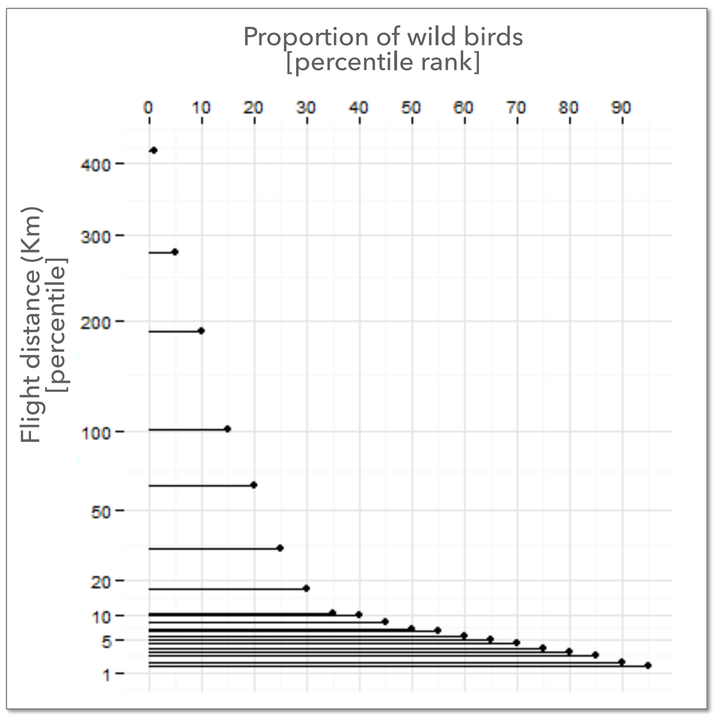
WRI takes into account the estimated prevalence of low pathogenic **AIVs** (**LPAIVs**) in wild waterfowl living in wetlands, and data on their census and flight distances, producing a map that allows the identification of the areas at risk of **LPAIV** introduction.

What you need:

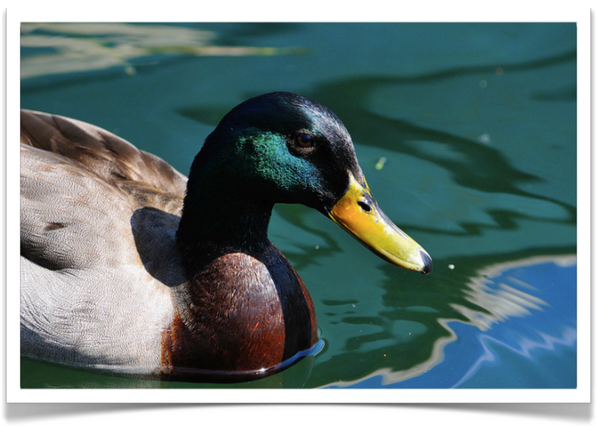
- European Environment Agency (**EEA**) reference grid, 1Km
- Georeferenced wetlands with Wild Birds Census (**GWBC**)
- Capture-recapture data (proxy for bird movements)
- **LPAIV** prevalence estimation in waterfowl

What to do:

Organize capture-recapture data into a complementary cumulative percentage distribution.

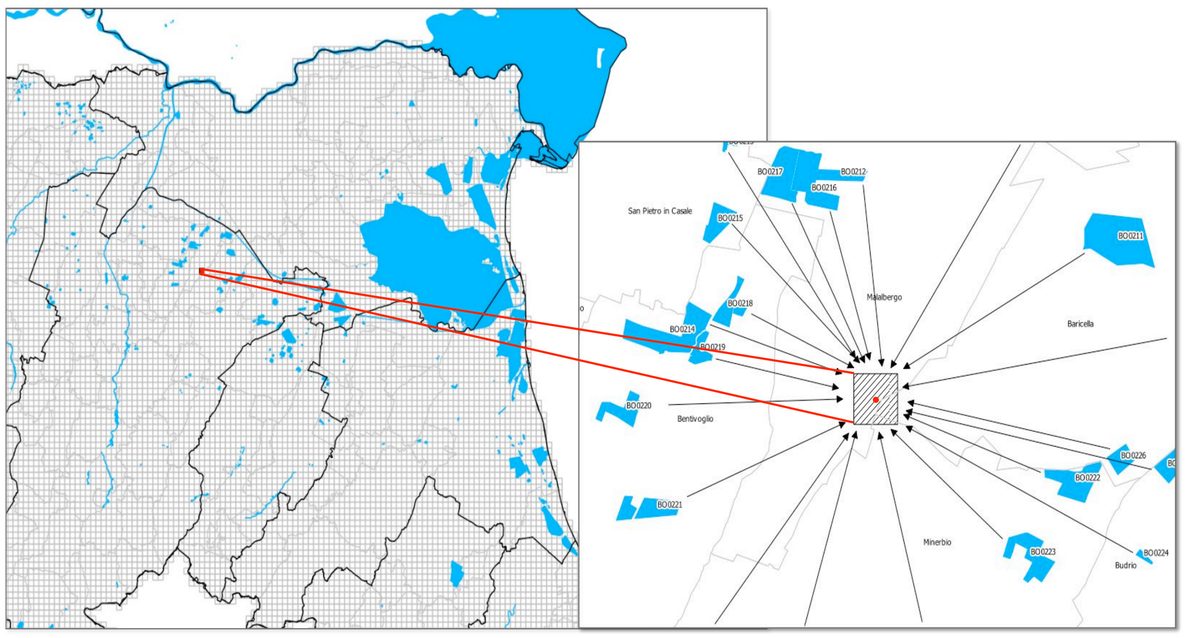


1



2

Compute the distance between cells' centroid of **EEA** 1Km vector grid and the **GWBC**.

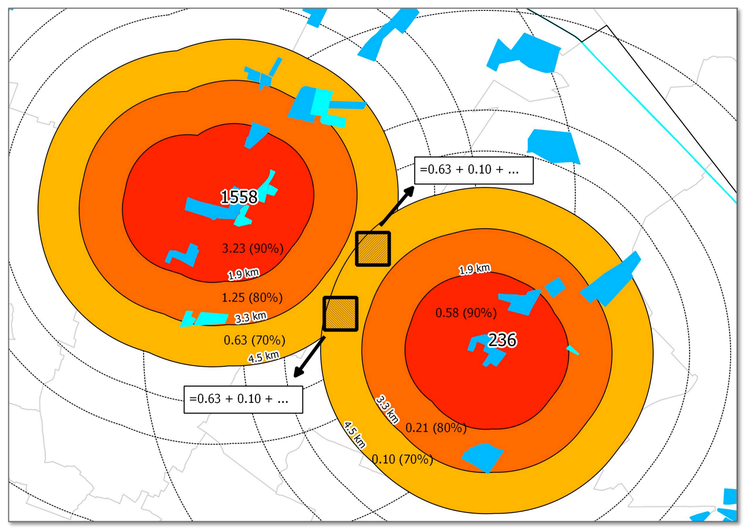


3

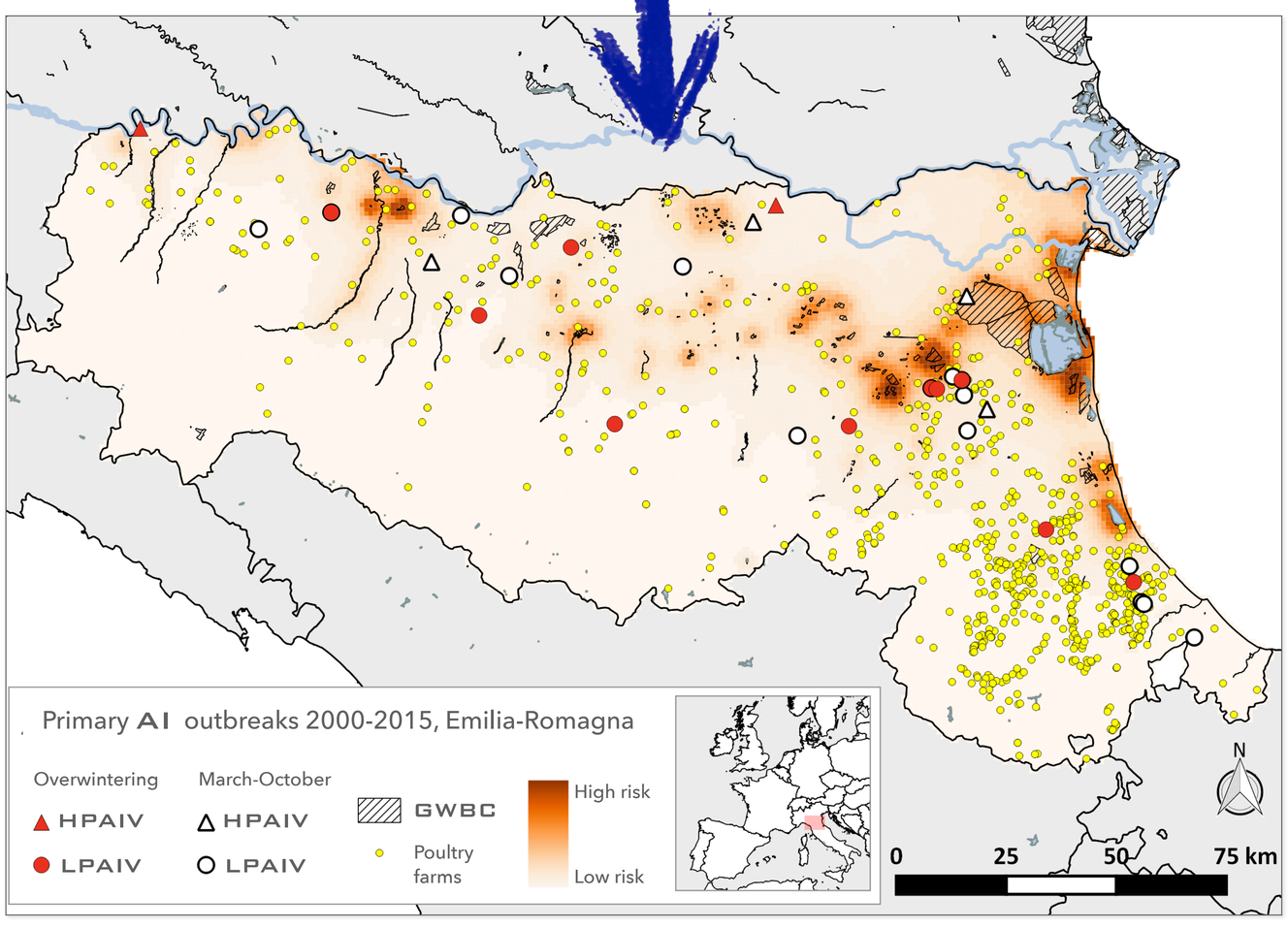
Draw buffers around each **GWBC**, using the selected percentiles of capture-recapture data as radius.

Compute 'density of infected wild birds' for each buffer of each **GWBC**.

For each cell, sum the appropriate density of each **GWBC**, considering the distance between the cell and the **GWBC**.



Plot the results:



We used census and prevalence data collected in winter at the end of the hunting season (data of the summer period are still lacking). Our **WRI** estimates the minimum risk of introduction of **LPAIVs** in winter.

We obtained a risk-of-introduction map for the whole regional territory, and assessed that most of the primary **AI** outbreaks have occurred within or nearby the high-risk area estimated by the **WRI**. This map allows the identification of commercial poultry farms at risk.

Further studies should be addressed to collect data on waterfowl census and **LPAIV** prevalence for the summer period, as surveillance studies on wild birds in the northern hemisphere have shown an annual peak of **AIVs** prevalence in late summer or early autumn.

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