

Predictive distribution mapping of central-place foragers to inform marine spatial planning

Emma J. Critchley^{1*}, James Grecian², Mark J. Jessopp³, John L. Quinn¹

*e.critchley@umail.ucc.ie | @ejcritchley | www.ornithology.ucc.ie

¹School of Biological, Earth & Environmental Sciences, University College Cork

²Sea Mammal Research Unit, Scottish Oceans Institute, University of St Andrews

³MaREI Centre, Environmental Research Institute, University College Cork



School of
Biological, Earth and
Environmental Sciences

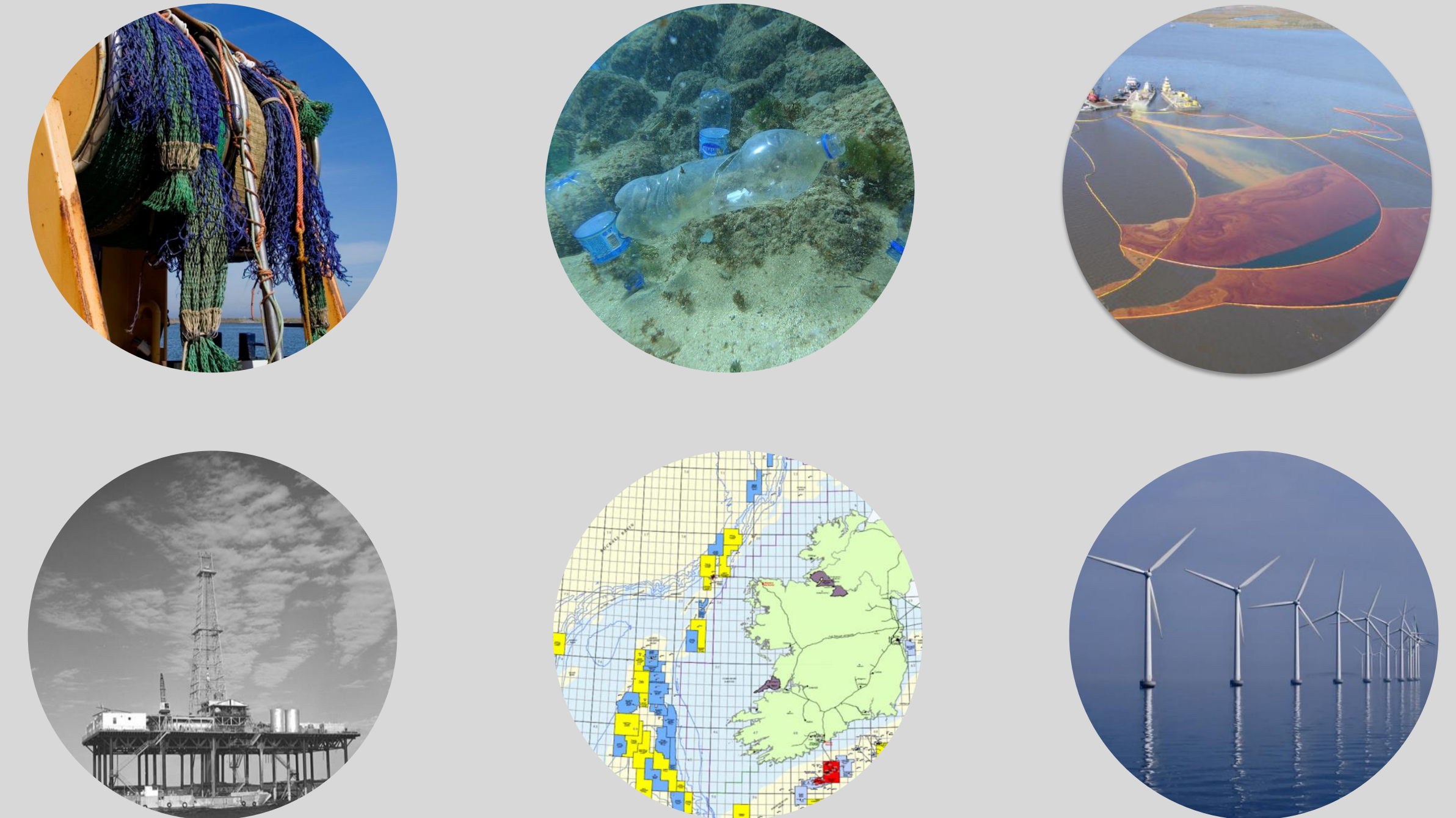


Project outline

Large marine vertebrates, such as seabirds, are considered to be key indicator species for assessing the health of marine environments. Their distribution at sea is often used for identifying important bird areas and designating Marine Protected Areas.

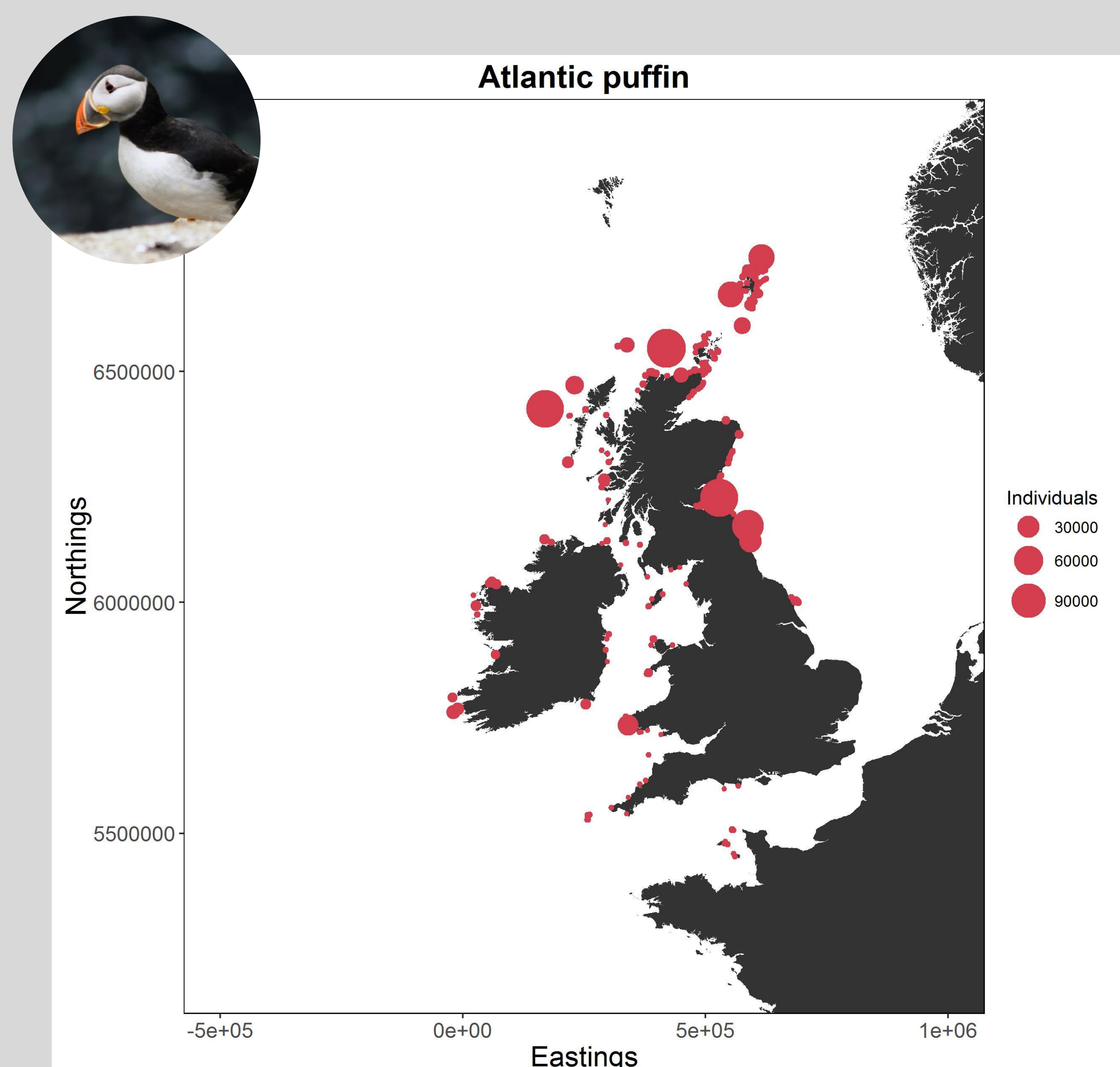
Predictive distribution models have the potential to be extremely useful in situations where there is a very little tracking or survey data available for seabird populations. They allow a quick assessment of distributions on a large community level, regional scale, and can help identify biodiversity hotspots for further investigation and to inform marine spatial planning.

For this project we use a predictive distribution model which can be applied to any central-place marine foragers. It utilises already available data on colony locations and population sizes, and can be readily updated when new data is collected.

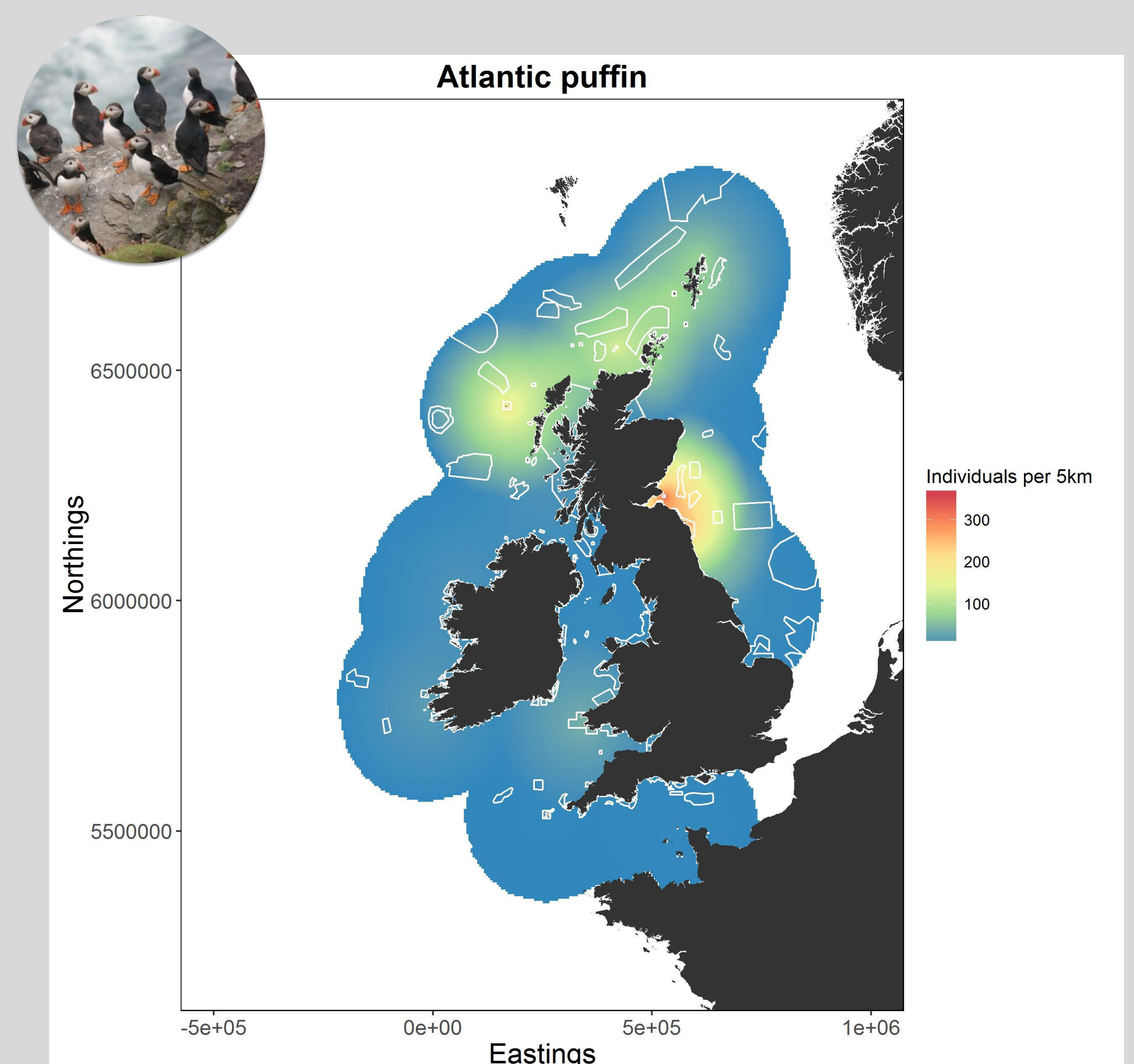


Seabird populations globally are under threat from multiple impacts including fishing, marine plastic, oil pollution and offshore energy developments.

Process to generate predictive distributions



Atlantic puffin colonies in Ireland and the UK. Colony size data obtained from the JNCC Seabird Colony Register. Values are the number of individuals at the most recent count for each colony.



Predicted at-sea distribution for the Atlantic puffin generated using the method described above. The white polygons show locations of designated protected areas in Ireland and the UK. Extracting the values for the predicted number of birds falling within these areas indicates that 16% of the Atlantic puffin population in Ireland and the UK occurs in protected areas.

Future applications

At a later date vulnerability maps will be added to the system, allowing users to assess the potential risks from oil spills or marine energy developments such as offshore wind-turbines.

All of the information generated by this project will be made available on **NEAPSA**, the **North East Atlantic Predictive Seabird Atlas**. This open-access online map viewer will enable stakeholders, including fossil fuel and renewable energy sectors, to identify, manage and mitigate potential at-risk hotspots where vulnerable species occur.