

Assessing the vulnerability of seabirds to oil pollution in Irish waters

Emma J. Critchley^{1,2*}, Adam Kane³, Mark J. Jessopp^{1,2}, John L. Quinn¹

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

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

²MaREI Centre, Environmental Research Institute, University College Cork

³School of Biology and Environmental Science and Earth Institute, University College Dublin



School of Biological, Earth and Environmental Sciences



Project Outline

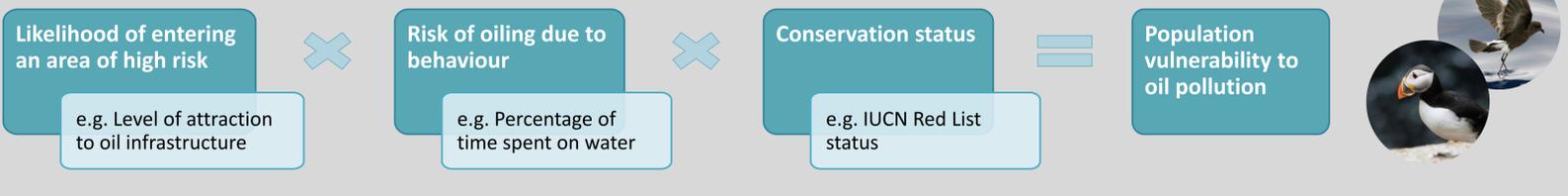
Seabird vulnerability to oil pollution has been highlighted during a number of high profile disasters such as Kowloon Bridge and Deepwater Horizon, where significant seabird mortality due to oiling has occurred. Understanding the risk posed by oil infrastructure to seabird populations is crucial for effective mitigation and management of risks.

We developed an Oil Vulnerability Index (OVI) and applied it to modelled distributions of breeding seabirds in Ireland and the UK, highlighting areas of greatest risk for the most vulnerable species during the breeding season.

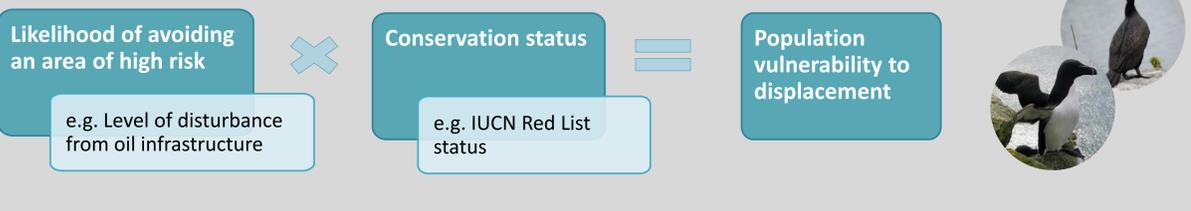
Seabirds which actively avoid oil infrastructure and service vessels may have lower oiling risks but could be impacted by subsequent displacement from habitats of importance. Therefore a separate index was generated to calculate this risk.



Oil Vulnerability Index



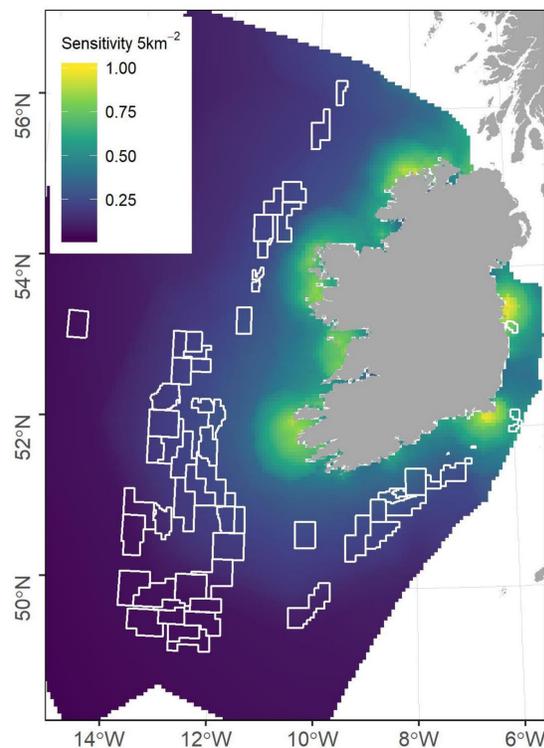
Displacement Vulnerability Index



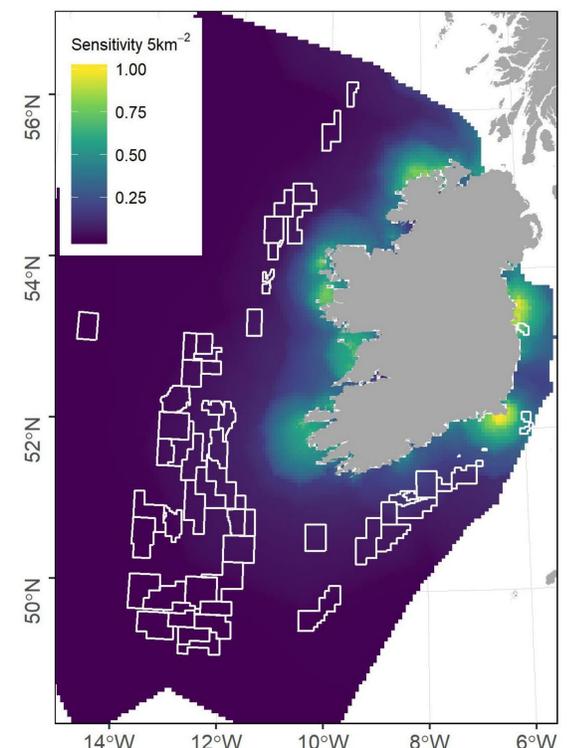
Spatial sensitivity



Species	Oiling vulnerability		Displacement vulnerability	
	Score	Rank	Score	Rank
Northern fulmar	0.80	1	0.27	22
Herring gull	0.78	2	0.38	16
Atlantic puffin	0.77	3	0.72	3
European storm-petrel	0.76	4	0.28	20
Lesser black-backed gull	0.74	5	0.36	17
Great black-backed gull	0.74	6	0.43	15
Manx shearwater	0.74	7	0.28	21
Black-headed gull	0.72	8	0.49	13
Common guillemot	0.71	9	0.76	1
European shag	0.71	10	0.63	5
Black-legged kittiwake	0.70	11	0.54	10
Razorbill	0.70	12	0.75	2
Northern gannet	0.66	13	0.54	11
Black guillemot	0.66	14	0.64	4
Great skua	0.64	15	0.35	18
Common gull	0.62	16	0.48	14
Great cormorant	0.57	17	0.52	12
Arctic skua	0.48	18	0.34	19
Sandwich tern	0.48	19	0.58	7
Arctic tern	0.47	20	0.57	8
Common tern	0.46	21	0.56	9
Little tern	0.46	22	0.59	6



Oil vulnerability of breeding seabirds in Ireland, white outlines show petroleum exploration.



Displacement vulnerability of breeding seabirds in Ireland, white outlines show petroleum exploration.

Future applications

Indices for vulnerability to marine renewables will be also be updated and applied to distribution maps to assess potential risks from 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 seabird species occur.