Ideas for spatial management of skates and rays in the Irish Sea

Dave Reid and Simon Dedman
Marine Institute and Galway Mayo Institute of Technology
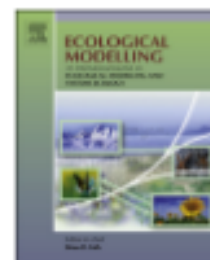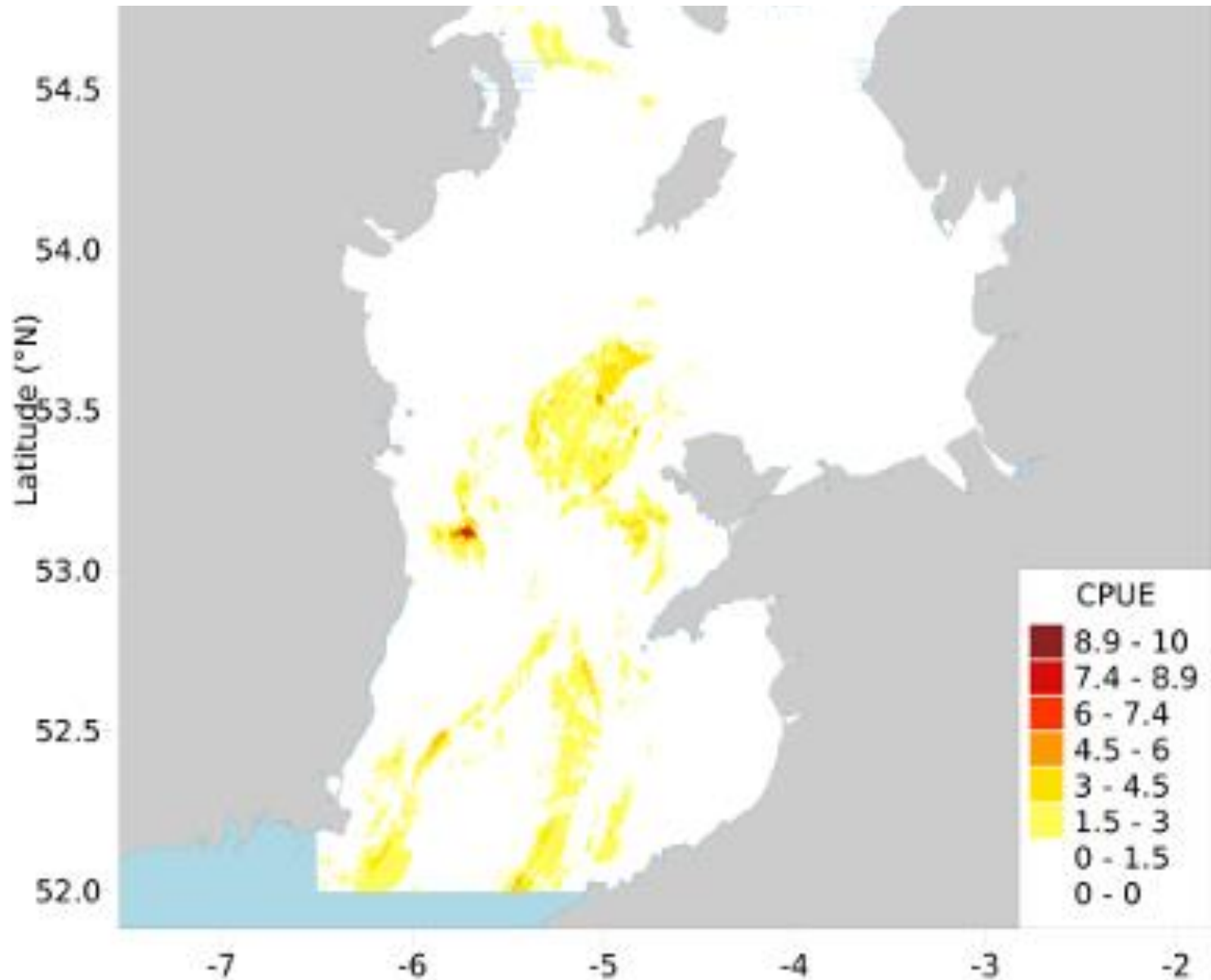**Ireland**

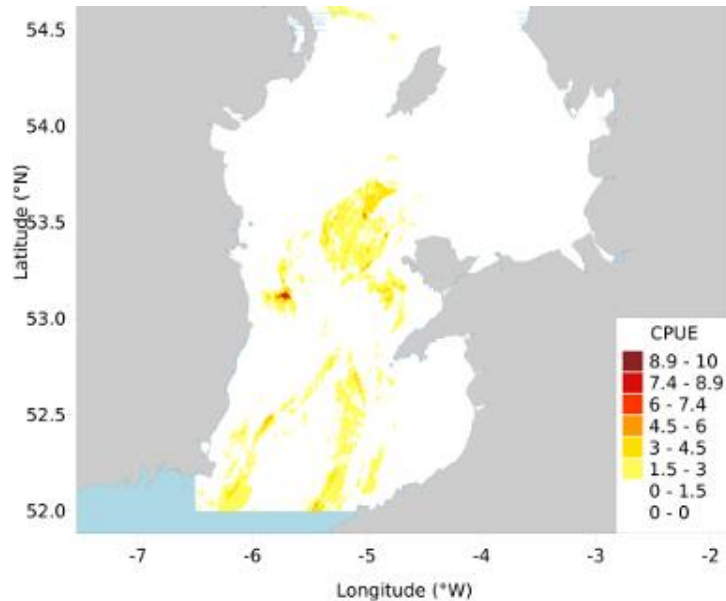# Modelling abundance hotspots for data-poor Irish Sea rays

Simon Dedman [a,b,*], Rick Officer [a], Deirdre Brophy [a], Maurice Clarke [b], David G. Reid [b]

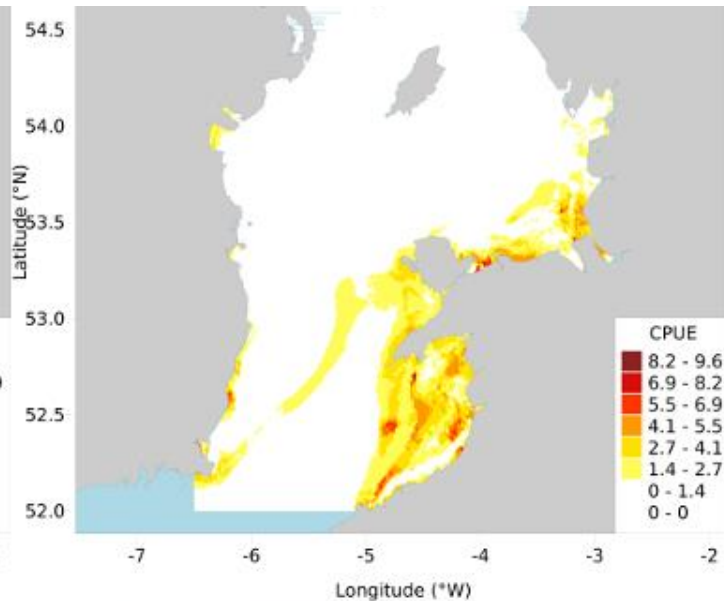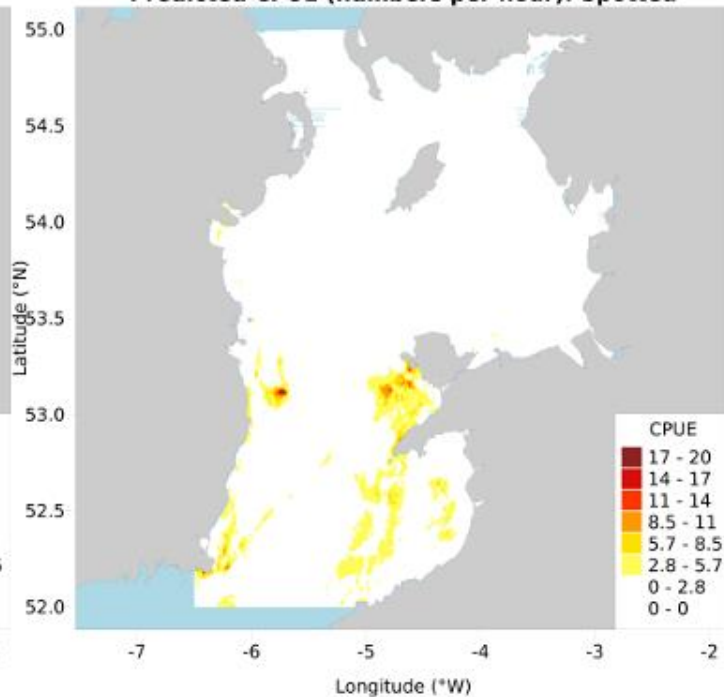# Model the catch per unit effort from the surveys - For cuckoo ray
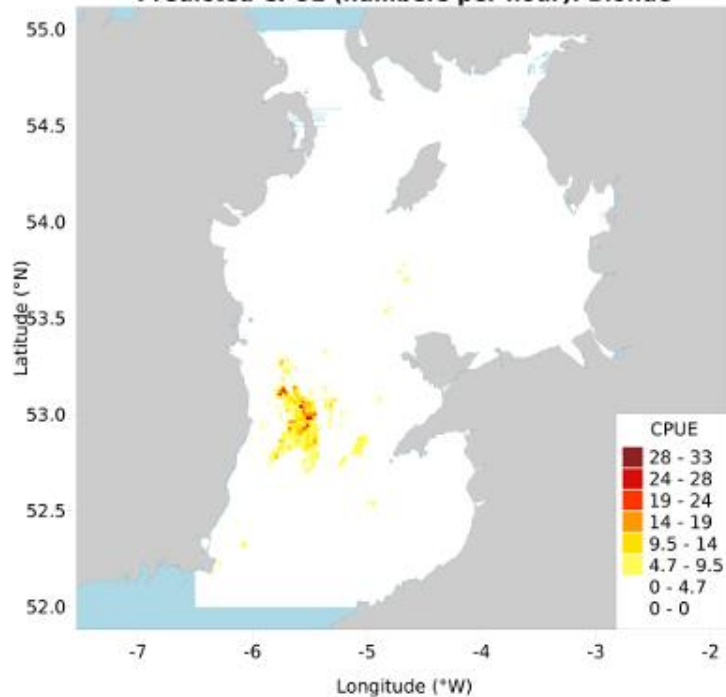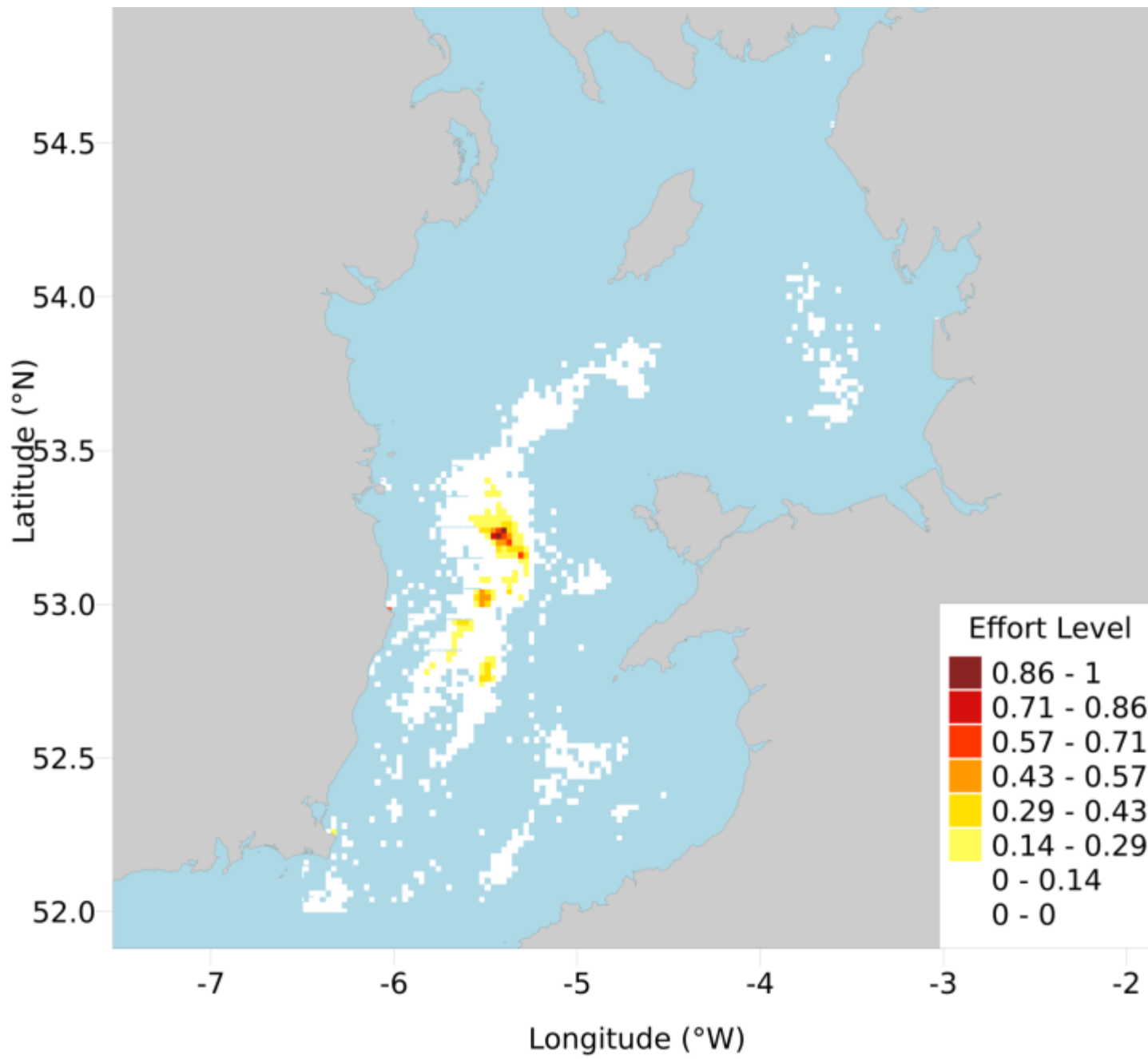
- For cuckoo, thornback, blonde and spotted ray

Predicted CPUE (numbers per hour): Blonde

Predicted CPUE (numbers per hour): Spotted

Fishing effort

Effort Level

- 0.86 - 1
- 0.71 - 0.86
- 0.57 - 0.71
- 0.43 - 0.57
- 0.29 - 0.43
- 0.14 - 0.29
- 0 - 0.14
- 0 - 0

Estimate a CPUE that corresponds to an MSY Harvest rate

Estimating biomass, fishing mortality, and "total allowable discards" for surveyed non-target fish
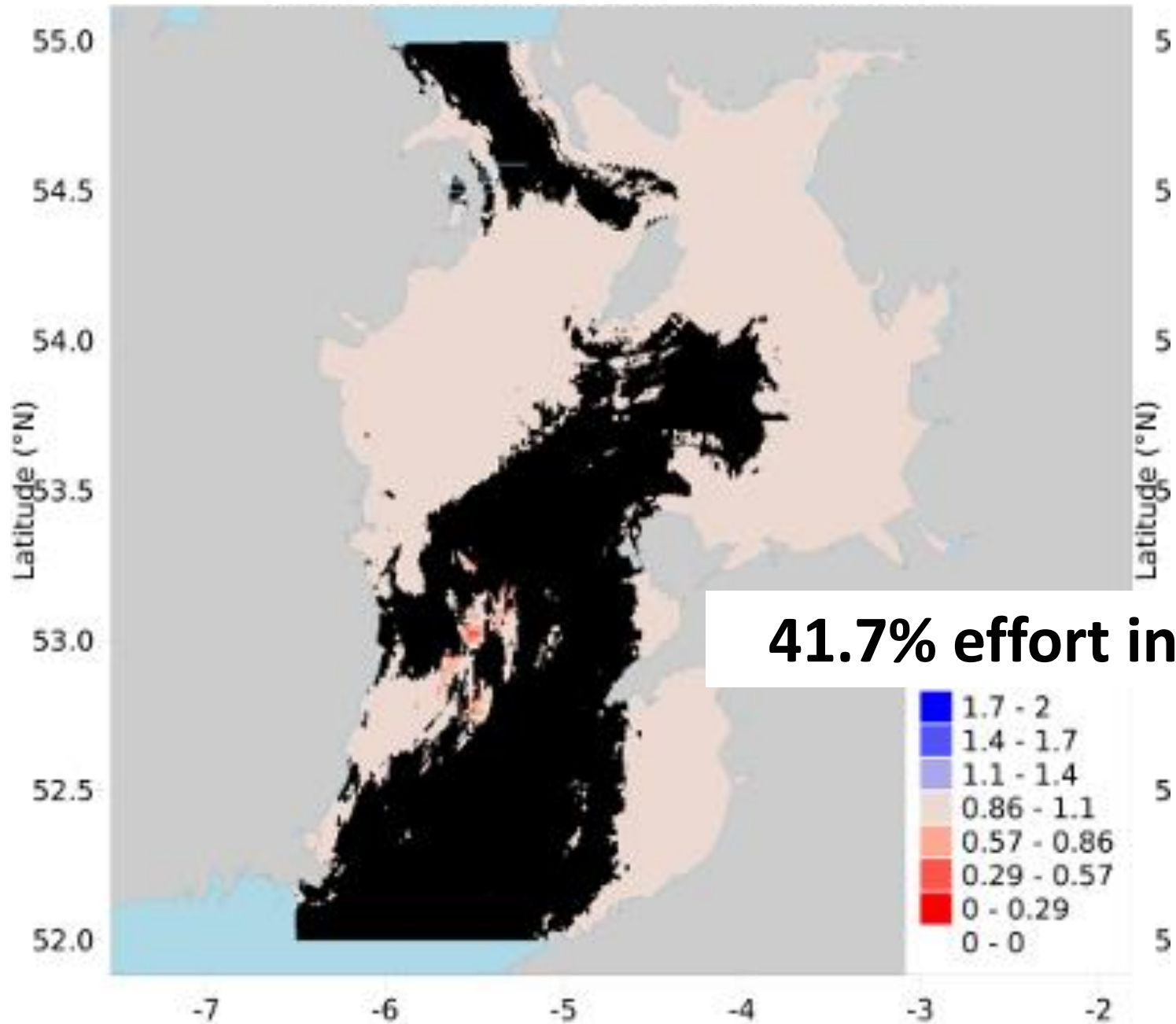
Q2   Samuel Shephard[1]*, David G. Reid[2], Hans D. Gerritsen[2], and Keith D. Farnsworth[1]

[1]School of Biological Sciences, Queen's University Belfast, 97 Lisburn Road, Belfast BT9 7BL, UK
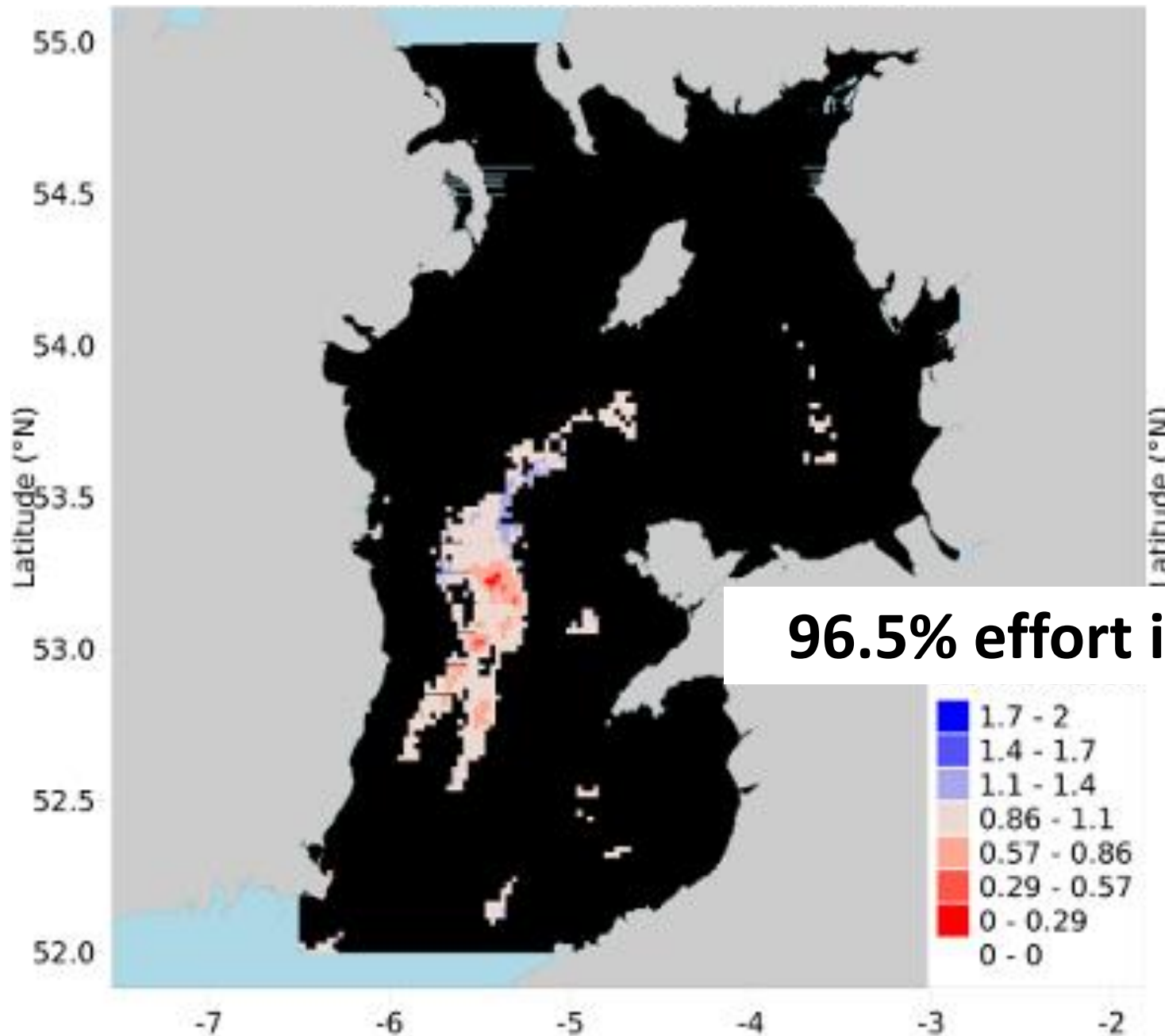20   [2]Marine Institute, Rinville, Oranmore, Co. Galway, Ireland
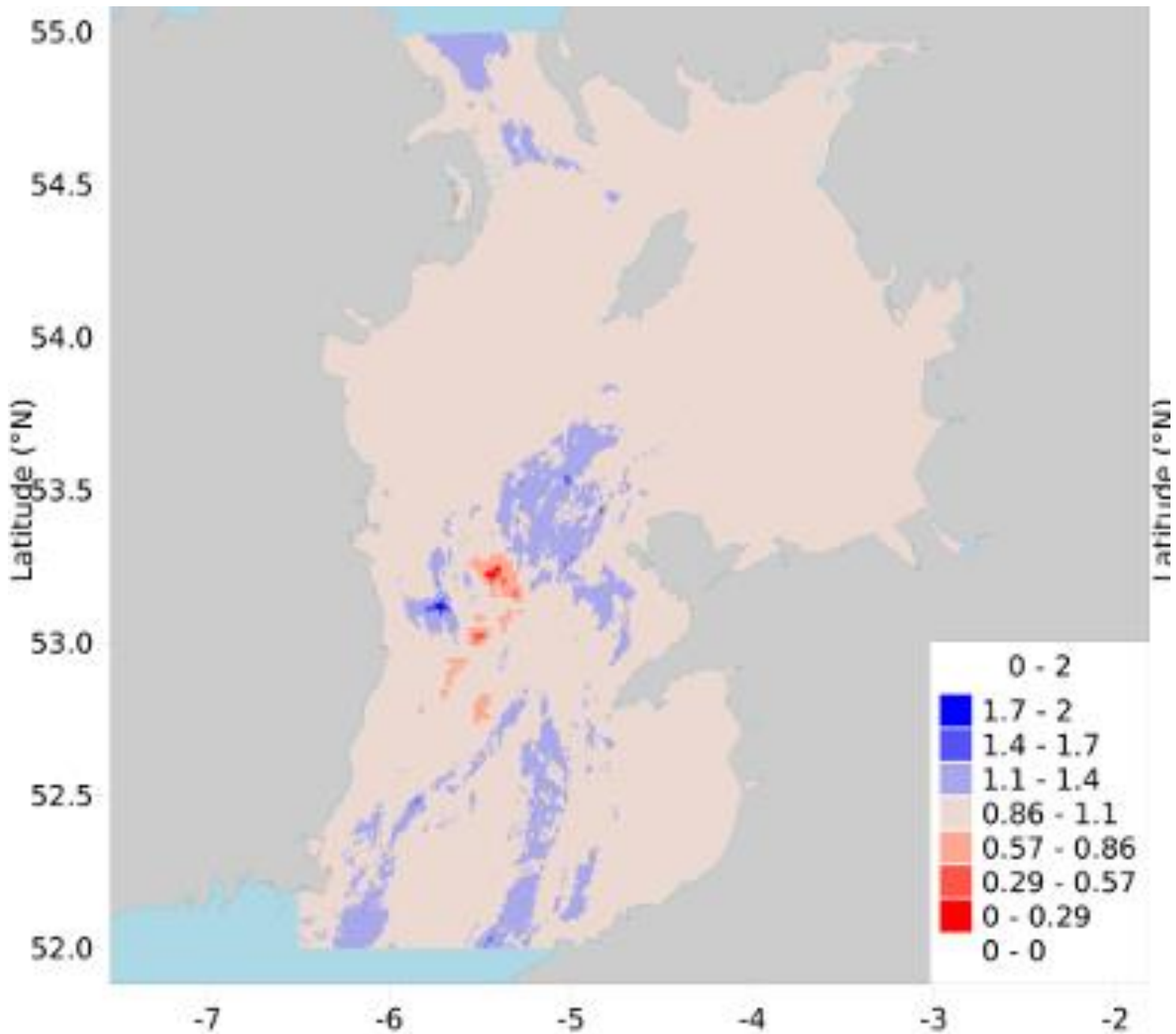
*Corresponding author: e-mail: s.shephard@qub.ac.uk

Traditional closures (most biomass of ray)

41.7% effort intact

Non Traditional closures - least effort

96.5% effort intact

Latitude (°N)

■ (blue)	1.7 - 2
■ (blue)	1.4 - 1.7
■ (light blue)	1.1 - 1.4
□ (pale)	0.86 - 1.1
■ (light red)	0.57 - 0.86
■ (red)	0.29 - 0.57
■ (bright red)	0 - 0.29
□ (white)	0 - 0

Cuckoo Survey CPUE and effort combined

Cuckoo Survey CPUE and effort combined closure

87.6% effort intact

Legend:
- 1.7 - 2
- 1.4 - 1.7
- 1.1 - 1.4
- 0.86 - 1.1
- 0.57 - 0.86
- 0.29 - 0.57
- 0 - 0.29
- 0 - 0
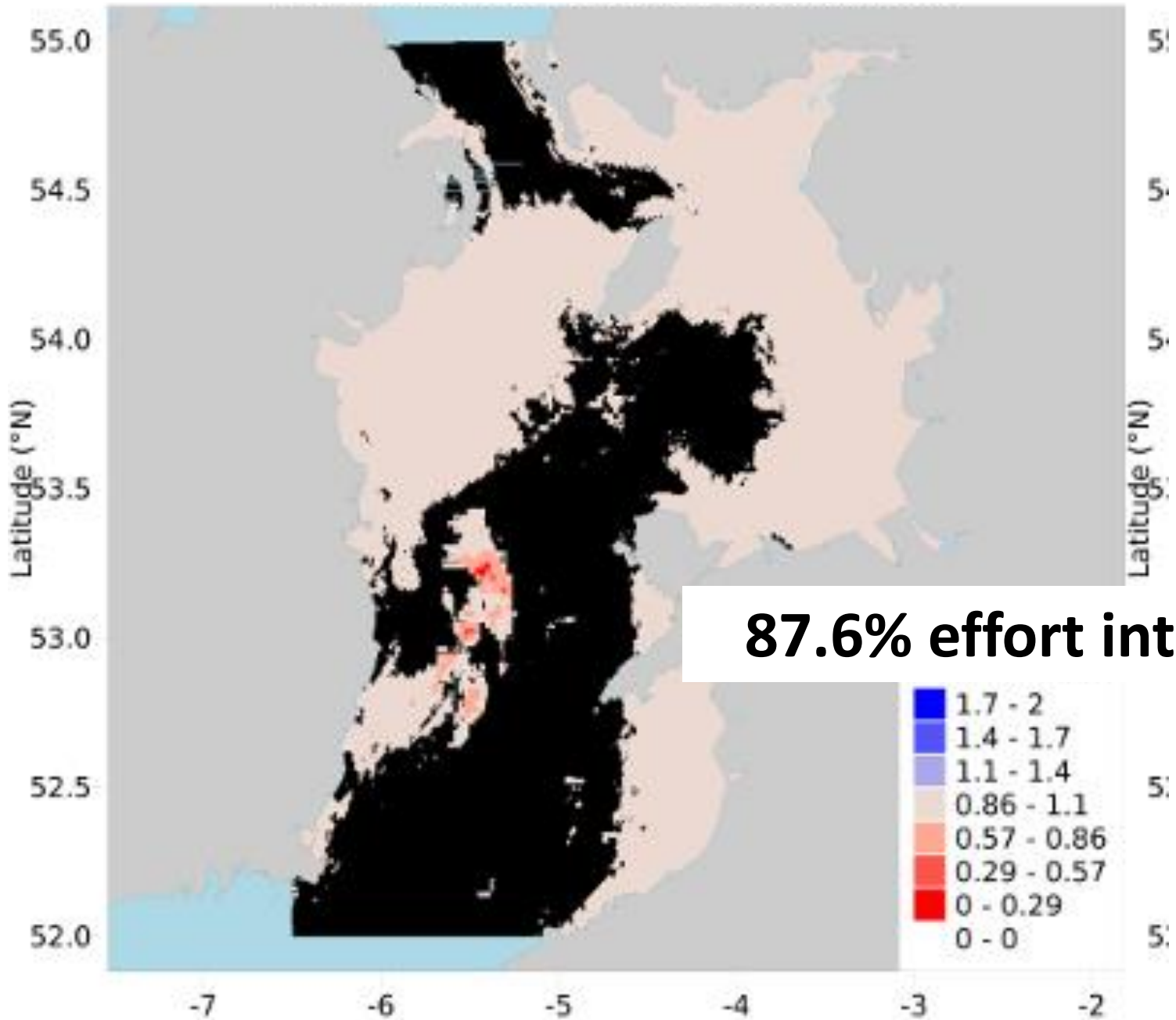
An interactive tool to chose where to close to protect core biomass and minimize effort displacement ?