

Multi-scale analysis of killer whale habitat use in Icelandic waters



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The main objective of this PhD project is to investigate the predator-prey dynamics between killer whales (*Orcinus orca*) and their main prey species, Atlantic herring (*Clupea harengus*), in a changing environment.

This study is the first to **combine biological and physical oceanography with killer whale and Atlantic herring ecology** to better understand the complex interactions between them and identify key habitats for both species in Icelandic waters.

An important focus of this study is quantifying **the impacts of shifts in prey abundance and distribution on killer whales** in Icelandic waters.

Two of a total of four research questions this study will be addressed within this poster presentation:

1. What is the relationship between killer whale distribution in Iceland and habitat components?
2. What affects the fine-scale habitat use and individual patterns of occurrence of killer whales in a herring spawning ground?

Model 1: Broad-scale

Environmental parameters + Modeled zooplankton + Potential prey

- Coastal and offshore waters of Iceland (Fig. 1)
- 1985 – 2023
- Various data sources: dedicated surveys, whale-watching, citizen-scientists, fishermen
- Presence only data
- All year, mostly summer months
- BIOMOD - a multi-model ensemble forecasting approach

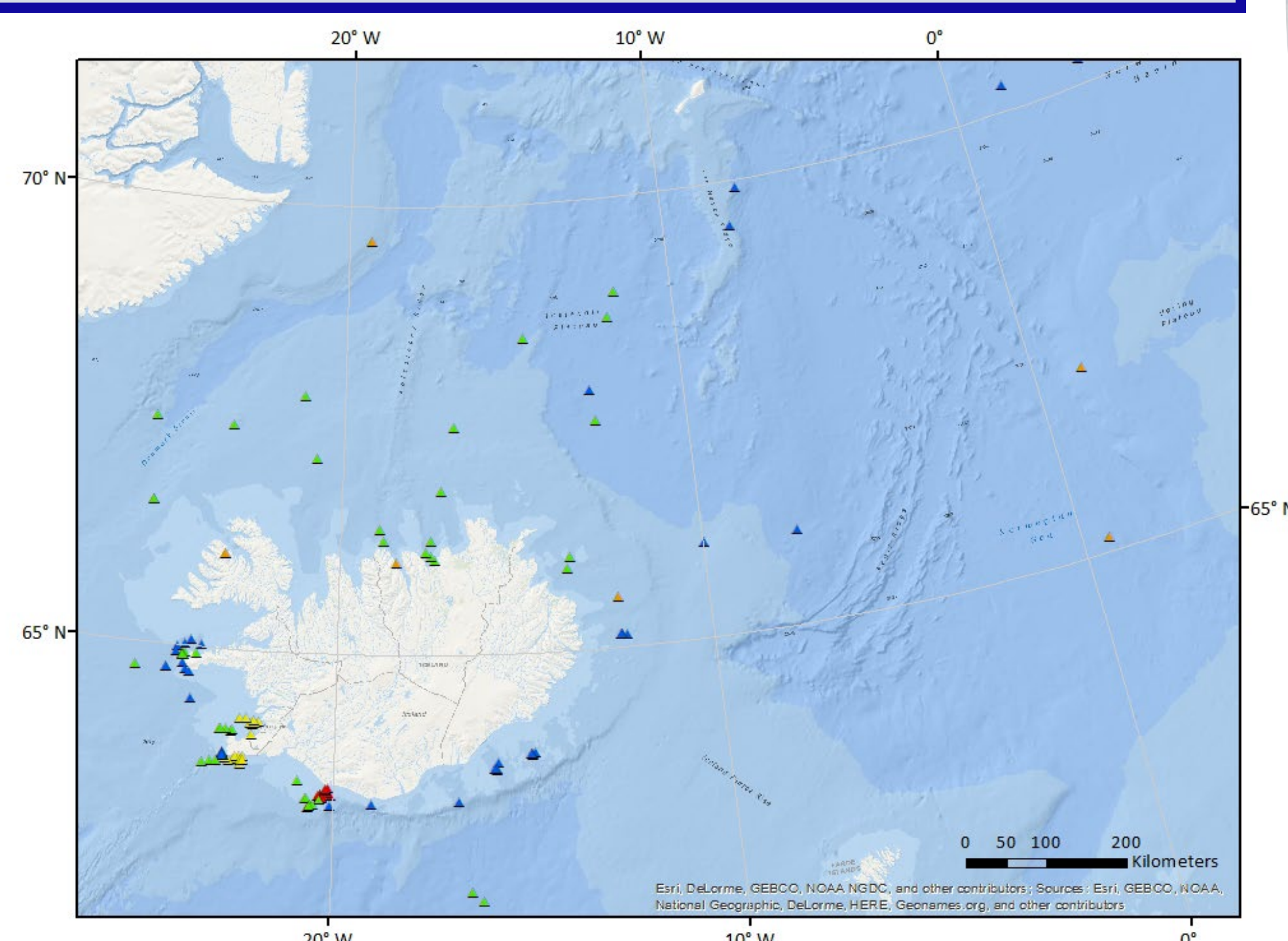


Figure 1. Study area of the broad-scale model, coastal and offshore waters of Iceland.



Model 2: Fine-scale

Environmental parameters + Herring abundance*

- Vestmannaeyjar archipelago (Fig. 2)
- 2008 – 2023
- Photo-ID data from dedicated boat surveys by the Icelandic Orca Project
- Presence-absence data
- June, July & August
- Occupancy models

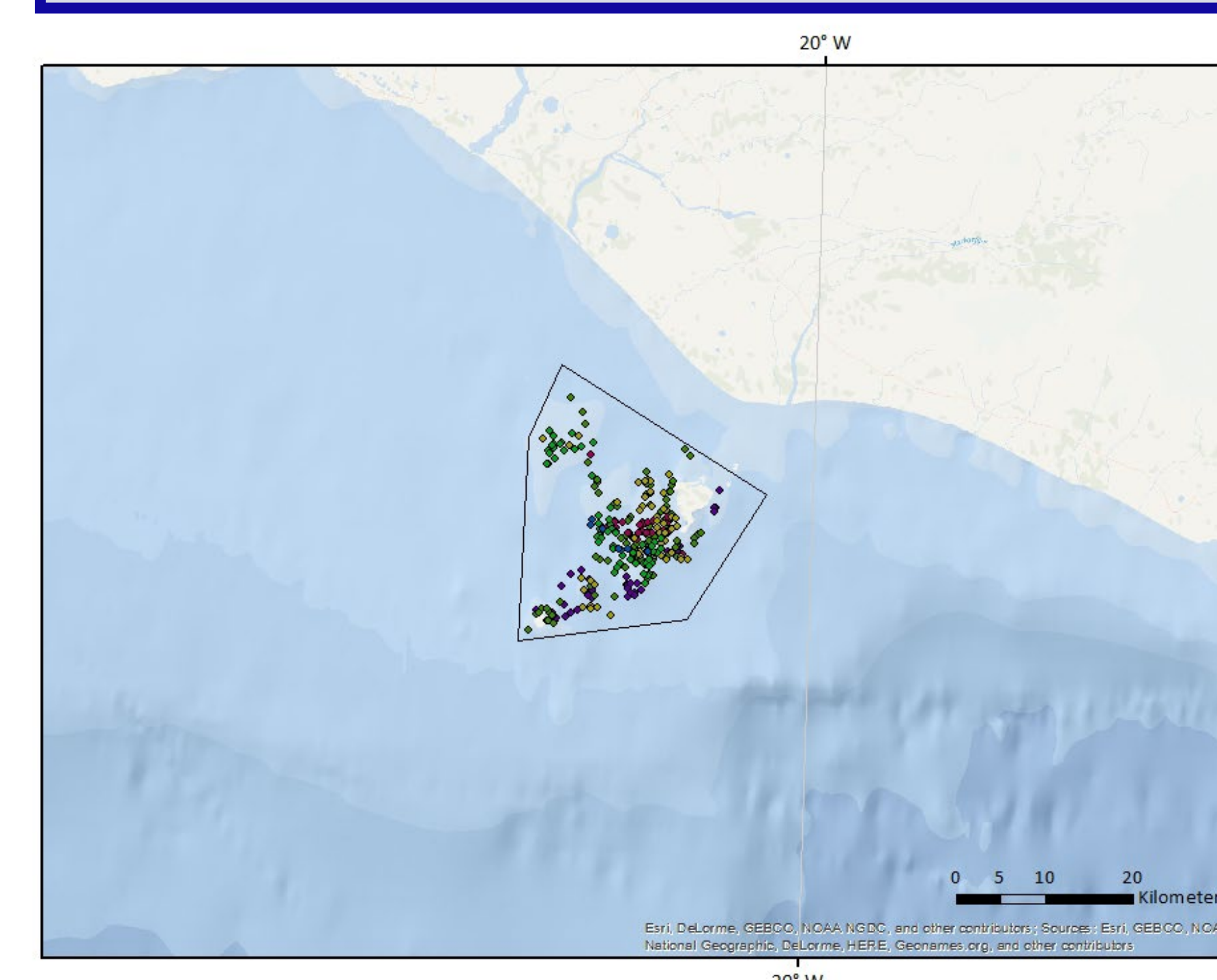


Figure 2. Study area of the fine-scale model, the Vestmannaeyjar archipelago, South Iceland.

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