



THE PREDICTIVE HABITAT SUITABILITY MAPPING OF MINKE WHALES, HUMPBACK WHALES AND WHITE-BEAKED DOLPHINS IN NORTH EAST ICELAND

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INTRODUCTION & METHODS

Marine spatial planning is a key way in which marine resources are managed and protected from a range of deleterious impacts, e.g. fisheries by-catch, chemical pollution. However, to be able to effectively designate protected areas (i.e. marine reserves) detailed maps describing the marine environment, in particular important habitats, are required. Cetacean species can act as bio-indicators of important marine habitats due to their apex position in marine ecosystems and communities. Therefore this study aimed to gain an appreciation of the habitat selection by cetaceans off the North East of Iceland (Figure 1), in particular Skjálfandi Bay, and then to predict other potential areas of cetacean habitat suitability which may require further research or increased management effort. Data was collected using whale watching vessels as platforms of opportunity, between the years 2004 and 2007, during the months of May to September.

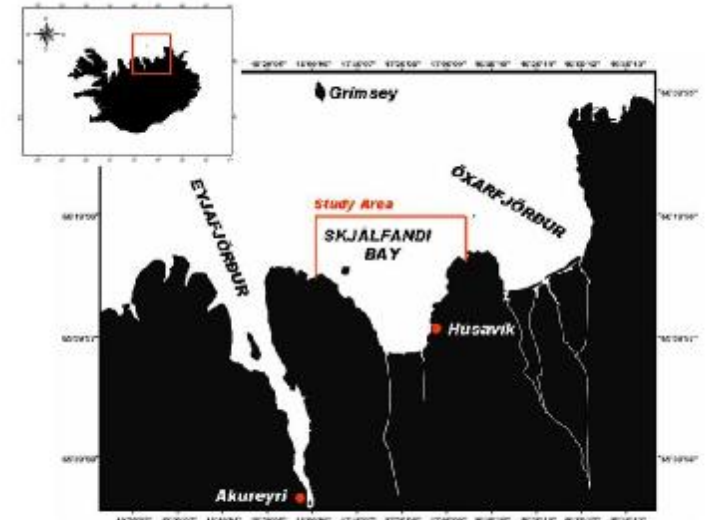
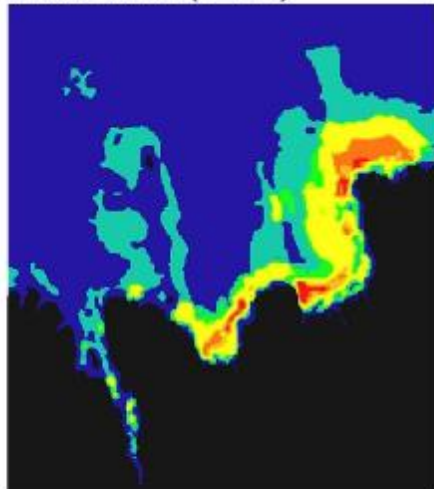


Figure 1. Map showing the location and extent of the study area within the north East of Iceland.

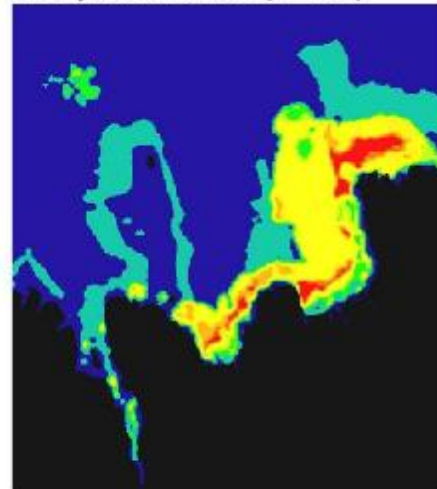
Minke Whale (n=346)



Eigen Values

Factor	Value	Expl.
CHL	20.515	0.20
Depth	51.185	0.50
CHL grd	17.469	0.17
SST grd	8.430	0.08
Slope	2.514	0.03
SST	1.320	0.01

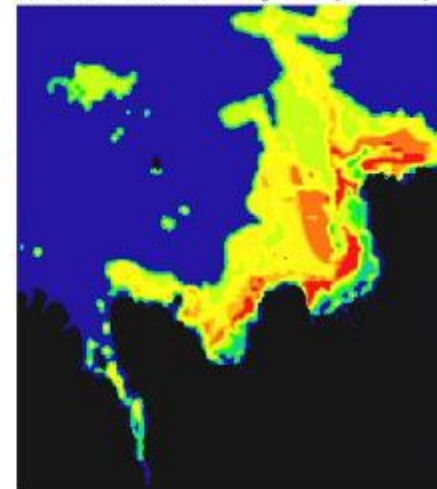
Humpback Whale (n=312)



Eigen Values

Factor	Value	Expl.
CHL	37.994	0.43
Depth	30.676	0.35
CHL grd	12.680	0.14
SST grd	4.987	0.06
Slope	2.029	0.02
SST	0.167	0.01

White-Beaked Dolphin (n=316)



Eigen Values

Factor	Value	Expl.
CHL	27.800	0.46
Depth	10.680	0.17
CHL grd	9.611	0.16
SST grd	6.505	0.10
Slope	4.021	0.07
SST	1.213	0.02

Figure 2. Predictive Habitat Suitability (HS) maps of minke whales, humpback whales and white-beaked dolphins for the North East of Iceland. Predictions were produced using Ecological Niche Factor Analysis (ENFA) utilising the program Biomapper 3.0. Eigen values for the different environmental parameters tested (depth, slope, sea surface temperature (SST) and SST gradient, chlorophyll-a concentration (CHL) and CHL gradient) are shown in the tables below.

SUMMARY OF RESULTS & CONCLUDING REMARKS

Sightings data was used to predict and explain potential high habitat suitability areas using the ecological niche modelling technique Ecological Niche Factor Analysis (ENFA). Results of the ENFA showed areas of potentially high levels of whale habitat suitability including the adjacent inlets of Eyjafjörður and Öxarfjörður, as well as areas beyond the Island of Grímsey in the Arctic Circle (Figure 2). In particular it was considered that oceanographic features, such as the cold Icelandic Current and local warm nutrient-laden glacial river plumes in the area, may be crucial to the spatio-temporal distribution of these three cetacean species within the waters of North East Iceland. Acknowledgments are given to the company North Sailing for provision of platforms, NEODAAS for supply of remote sensing data & the volunteers who assisted with data collection