

Biodiversity over the horizon: modelling the distribution and abundance of marine waterbirds in the Inner Danish Waters

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Abstract:

The shallow marine waters around Denmark support globally significant aggregations of divers, seabirds and alcids in winter. Complete aerial survey of marine waterbirds in the Inner Danish Waters was achieved for the first time in 2008. Data from line transects were subjected to distance sampling and spatial modelling techniques to generate density surfaces and total population estimates for the entire area, equating to over one million individuals from the seven most numerous species. These density surfaces showed very few diversity “hot-spots”, because key species showed conspicuously mutually exclusive distributions, probably due to their contrasting feeding ecology. The network of European Union Special Protection Areas and Ramsar Wetlands of International Importance in the Inner Danish Waters was mostly designated in 1983 to protect the most important areas of water for these species. The boundaries of the existing site-safeguard network coincided well with the highest densities of marine waterbirds found in the survey 25 years later for all species except the alcids. Total species abundance estimates differed from earlier surveys in 1968-73 (Joensen 1974) and 1988 (Laursen *et al.* 1997) between species, but differences in survey area and techniques between surveys and large variation in between-year avian abundance precludes firm conclusions about long-term trends in abundance. However, Long-tailed Ducks do seem to have declined in Danish waters in parallel with trends witnessed in the rest of the Baltic.

References:

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- Laursen, K., Pihl, S., Durinck, J., Hansen, M., Skov, H. Frikke, J. & Danielsen, D. (1997). Numbers and distribution of Waterbirds in Denmark 1987-1989. *Danish Review of Game Biology* 15(1): 1-181.