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TITLE: Comparing marine distribution maps for seabirds during the breeding season derived from different survey and analysis methods

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ABSTRACT:

Understanding how seabirds use the marine environment is key for marine spatial planning, and maps of their marine distributions derived from transect-based surveys and from tracking of individual bird?s movements are increasingly available for the same geographic areas. Although the value of integrating these different datasets is well recognised, few studies have undertaken quantitative comparisons of the resulting distributions. Here we take advantage of four existing distribution maps and conduct a quantitative comparison for four seabird species (black-legged kittiwake Rissa tridactyla; European shag Phalacrocorax aristotelis; common guillemot Uria aalge; and razorbill Alca torda). We quantify the amount of overlap and agreement in the location of high use areas identified from either tracking or transect samples and use Bhattacharyya?s Affinity to quantify levels of similarity in the general distribution patterns. Despite multiple differences in the properties of the datasets, there was a far greater degree of overlap than would be expected by chance, except when adopting the most constrained definition of high use. Distance to the nearest conspecific colony appeared to be an important driver of the degree of similarity. Agreed areas of highest use tended to occur close to colonies and, with increasing distance from colonies, similarity between datasets declined and/or there was similarity in respect of their being relatively low usage. Interpreting reasons for agreement between data sources in some areas and not others was limited by an inability to control for the multiple potential sources of differences from both the sampling and modelling processes of the underlying datasets. Nevertheless, our quantitative comparative approach provides a valuable tool to quantify the degree to which an area?s importance is corroborated across multiple datasets, and therefore confidence that an important area has been correctly identified. This can help prioritise where the implementation of conservation measures should be targeted and identify where greatest scrutiny is required of the potential adverse environmental effects of any planned anthropogenic activities.

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