Assessing the cumulative displacement of seabirds at offshore windfarms in the North Sea

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Context of Research

The continual growth of more, larger windfarms in UK coastal waters will lead to a substantial area of the sea being used to generate renewable energy. With windfarms being sited in relative proximity to one another, the interaction of environmental impacts, or cumulative environmental impacts, is becoming an increasing concern. The assessment, or lack of assessment, of such collective impacts have previously led to delays in granting consent for windfarm development and even refusal of planning consent. This can have a knock-on effect on the start of construction and operation, costing time and money. This work will address a critical knowledge gap by examining what extent of cumulative displacement on seabird populations is caused by offshore renewable energy. This will help to better inform plan- and project-level environmental assessments, and reduce the uncertainties surrounding cumulative effects. Subsequently, the risks associated with consent applications will be reduced.

Cumulative

In combination with other developments

Displacement

Movement away from windfarms

Findings

Every development must assess its impact in combination with the impacts from other developments. Reviewing CEAs to determine which developments have assessed which species, in combination with which other developments, tells an interesting tale. Figure 1 represents the windfarms that were included in cumulative assessments on seabird displacement. For example, the cumulative assessment carried out by Moray East offshore windfarm (in the orange box) analysed its impact in combination with Beatrice and Aberdeen windfarms (shown by the orange arrows). Beatrice included Moray East in its cumulative assessment (red arrow), however Aberdeen did not include Moray East (no arrow). There is clear disparity in each development's assumption on their cumulative impact. This is an example for just the effects of seabird displacement. On an individual species level of assessment, each windfarm has assessed different species cumulatively with different windfarms, for different reasons. Furthermore, inconsistency in data collection and analysis meant that each development has treated data differently. Cross-windfarm results are therefore often not comparable; this was especially prevalent where there was a lack of data on a certain species. As a result, cumulative assessments have become difficult to undertake and often result in large uncertainties in their conclusions. A more strategic and consistent approach is needed to allow comprehensive cumulative assessments to be made. Without this, some species may go un-assessed for various reasons, or some developments not assessed cumulatively.

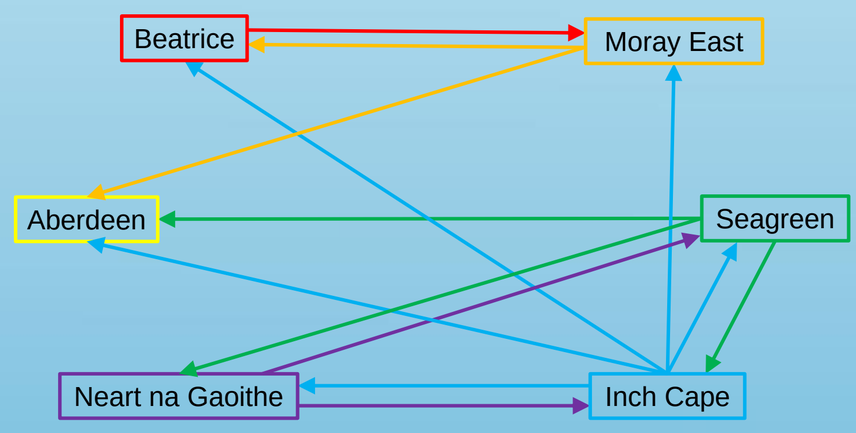
Aims and Objectives

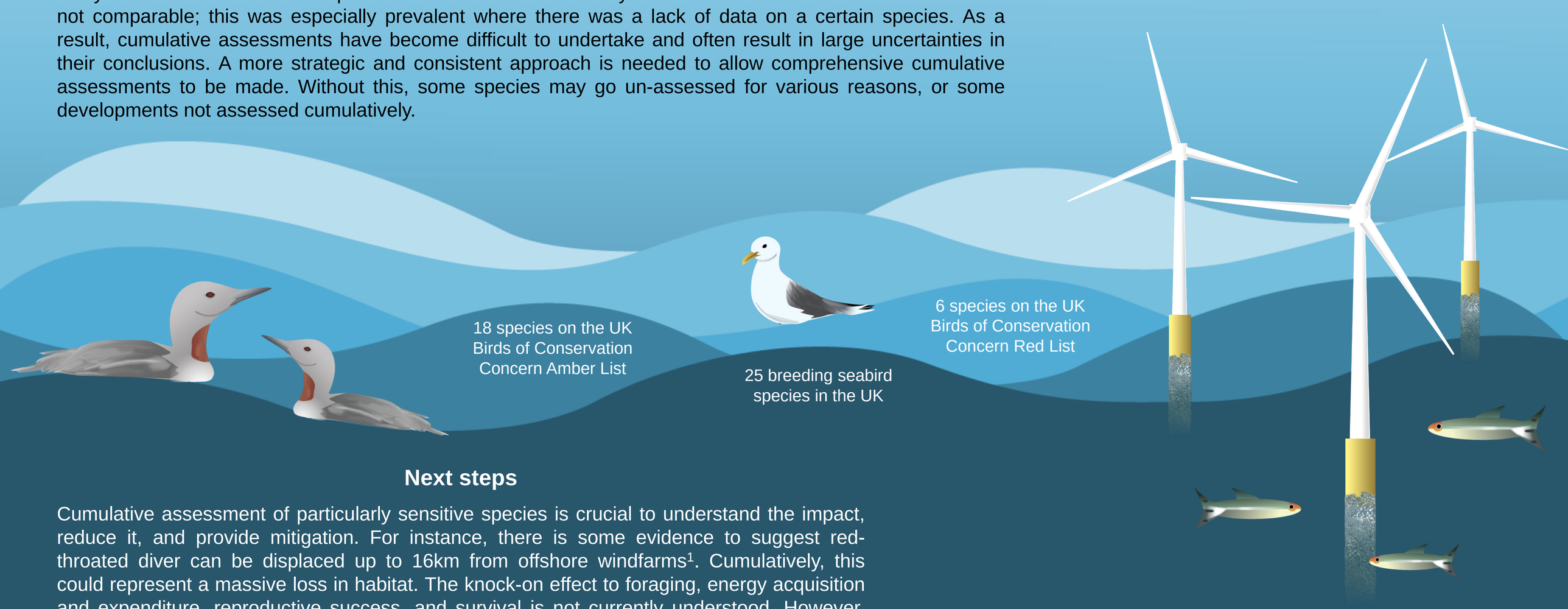
The aim of the research is to investigate the cumulative displacement of birds at offshore windfarms.

The objectives of this research are

- To investigate which species have been analysed in Cumulative Effects Assessment (CEA) by different UK offshore windfarm developments
- To calculate the actual displacement of seabirds at offshore windfarms and compare the calculated displacement with predicted displacement
- To evaluate the scale of cumulative seabird habitat loss across the North Sea

Figure 1: Who assesses who?





Next steps

Cumulative assessment of particularly sensitive species is crucial to understand the impact, reduce it, and provide mitigation. For instance, there is some evidence to suggest red-throated diver can be displaced up to 16km from offshore windfarms[1]. Cumulatively, this could represent a massive loss in habitat. The knock-on effect to foraging, energy acquisition and expenditure, reproductive success, and survival is not currently understood. However, there is little consensus on just how far divers are displaced, or even if current monitoring is sufficient to detect their displacement. Therefore, power analysis will be used to model how far displacement can be detected. This will then build an evidence base to inform seabird monitoring at offshore windfarms. It will also help reduce the uncertainty surrounding displacement of red throated diver, aiding consent applications. Following this, seabird distribution maps and spatial data on existing and planned UK offshore windfarm will be used to determine the proportion of sea area that has and will be lost. This will help inform future windfarm planning at a strategic level. Furthermore, it will identify species for which cumulative displacement could be a concern at a cumulative scale.

A planning conundrum

The progression of renewable energy faces a conundrum. One of the drivers of biodiversity change is climate change, and renewables form part of the solution. However, a larger driver of biodiversity change is alterations in land and sea use, which renewable energy development contributes to. Therefore, there is an urgent need for the sustainable development of renewable energy which takes ecological interactions into account, from individual wind turbines to a multi-windfarm scale.

[1] Mendel, B, Schwemmer, P., Peschko, V., Müller, S., Schwemmer, H., Mercker, M. & Garther, S. (2018) Operational offshore wind farms and associated ship traffic cause profound changes in distribution patterns of Loons (Gavia spp.). Journal of Environmental Management 231:429-438