Natura Impact Statement

NISA

North Irish Sea Array

Volume 2: Appendices

Appendix 15

NPWS Review of Method Statement

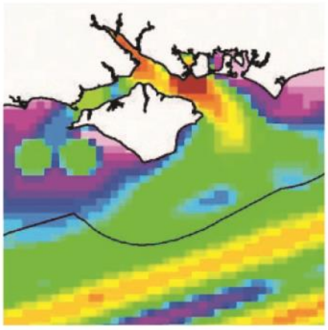
Statkraft CIP Copenhagen Infrastructure Partners GoBe APEM Group ARUP

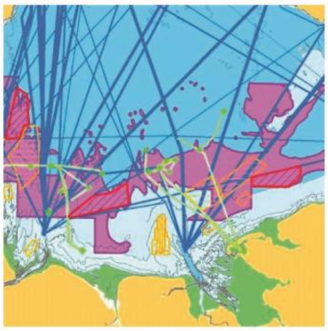
An tSeirbhis Páirceanna Náisiúnta agus Fiadhúlra (National Parks and Wildlife Service)

Review of Method Statement

Offshore Wind Ornithology Assessment for East Coast Phase 1 Projects

November 2023

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Review of Method Statement

Offshore Wind Ornithology Assessment for East Coast Phase 1 Projects

November 2023

Seabird foraging aggregation in the Irish Sea

Document Information

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Contents

1 Introduction

1.1 Background information

This document is a summary review of the *Method Statement - Offshore Wind Ornithology Assessment for East Coast Phase 1 Projects* (*Revision: 1.0)* (GoBe Consultants Ltd 2022) on behalf of An tSeirbhis Páirceanna Náisiúnta agus Fiadhúlra (National Parks and Wildlife Service). What is otherwise termed an Offshore Ornithology Assessment Methodology Note (dated December 2022) (hereafter termed the "Note") was submitted by GoBe Consultants representing ARUP and GoBe (APEM Group) on behalf of the (unnamed) developers of several proposed wind farm projects, namely Arklow Bank Wind Park, Codling Wind Park (comprising Codling I and Codling II), Oriel Wind Farm, Dublin Array (previously known as Bray and Kish Banks) and North Irish Sea Array (NISA) termed "the Projects"[1].

The Projects comprise the five (derived from six[2]) east coast projects[3] Phase 1 Maritime Area Consents (MACs) granted by the Minister for the Environment, Climate and Communications, with a commencement date of 23 December 2022. Maritime Area Consent (MAC) is the first step in a new planning process (Maritime Area Planning Act 2021) in which successful projects may then proceed to apply for development (planning) permission from An Bord Pleanála, where the project proposals will undergo environmental assessment. A MAC also enables successful Phase 1 projects to participate in the ORESS 1, the first auction planned for offshore wind under the Renewable Electricity Support Scheme (RESS).

1.2 Approach

The objective of the aforementioned note to inform and consult stakeholders of the intended approach to all major aspects of the ornithological assessment is noted. A developer-led collaborative approach that aims to standardise assessment methods and facilitate agreement between the projects and the regulators and stakeholders is attractive and welcomed, particularly in the context of comparability and to promote the rigorous assessment of cumulative effects.

A not altogether dissimilar approach elsewhere (e.g. amongst Round 2 developments in the Greater Wash in England) proved useful in allowing the relative impacts and thus merits/disbenefits of different projects in a similar area to be effectively judged. However, such an approach benefits from similar timelines of submission or some form of agreed 'building-block' approach to be developed and adopted with a defined sea area and timescale. The relevant marine area in this context is the Irish Sea and St Georges Channel, within which a number of further proposals for development are anticipated (e.g. North Sea Irish Array 2, North Sea Irish Array 3) along a length of coast of around 200 km.

The need to assess cumulative effects from proposed developments in further sea areas and/or rounds of development is also anticipated for wide-ranging dispersive or migratory seabirds and migratory land/wetland/coastal birds amongst other mobile receptors such as marine mammals, sea turtles and

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1 Note that the Method Statement would benefit from the presentation of an accurate map to place the various projects in context, both in relation to each other and to any areas, protected or otherwise, known to incorporate ornithological interest.

2 Consent was granted to six east coast projects including Bray Bank and Kish Bank, which were subsequently combined as "Dublin Array", and Arklow Bank II of Arklow Wind Park that also contains Arklow Bank I that is currently Ireland's only operational offshore wind farm.

3 A single project, Skerd (Sceirde) Rocks, on the west coast of Ireland was also consented under Phase 1.

some wide-ranging marine (e.g. Basking Shark *Cetorhinus maximus*) or anadromous fish (e.g. Atlantic Salmon *Salmo salar*)[4].

That "the Projects" will continue to engage with stakeholders to refine assessment methods as required, is also supported.

1.2.1 Underpinning data

In this case of the aforementioned east coast Projects, the rigour of the assessment of their relative and combined effects and impacts according to the methods proposed, or any alternatives suggested, is fundamentally underpinned by the quantity and quality and thus suitability for purpose of the data gathered, and it is anticipated that this is the subject of a separate process in relation to each project and the Projects as a whole.

In particular, methods to determine the distribution and abundance of each species, especially seabirds, with the latter expressed in terms of density (typically individuals km^{-2}) and population size estimates within defined areas (e.g. the site and site plus specified buffer) should be consistent across the projects, which may or may not include specific adjustments linked to any differences in data gathering. The latter may include, but are not exclusive to, the frequency and timing of surveys (typically covering breeding and non-breeding seasons), statistical power of the surveys undertaken, nature of the survey platform and areas surveyed in the case of boat-based surveys), availability bias whereby diving seabirds may be below the surface (especially pertinent in relation to fast-moving and time-limited digital aerial surveys [DAS] - see Parker *et al*. 2022) and data compatibility with distance sampling (e.g. Buckland *et al*. 2004, Harwood 2019). Specifically in relation to boat-based surveys, the use of radial snapshots for flying birds rather than the box method standard in ESAS (European Seabirds at Sea) surveys has been demonstrated to produce more accurate density estimates of birds in flight (Berridge *et al*. 2019), critical to the accuracy of the assessment of collision risk (see Section 2.1 below).

This review of proposed methods of assessment is undertaken without prejudice to any separate process(es) to determine the quality and accuracy of the underpinning data.

1.2.2 Ornithological receptors

For each potential receptor, CIEEM (2019) recommend that a relevant Zone of Influence (ZoI) is established and characterised with a robust evidence base, bearing in mind that the ZoI will vary depending on the characteristics of environmental features and the ecology of the species concerned. As a first step, a combination of desk-based study and consideration of existing datasets is recommended (Parker *et al*. 2022).

For breeding seabirds, it is useful to determine the location of all seabird breeding colonies over a wide area, classifying each colony according to any designation and any designated (qualifying) species or any species within a qualifying assemblage where relevant. Internationally important Special Protection Areas (SPAs) incorporating colonies of seabirds that are likely to be of relevance to the Projects include Dalkey Islands SPA, Ireland's Eye SPA, Lambay Island, Rockabill SPA, Skerries Islands SPA and Wicklow Head SPA.

[4] Details of other dedicated marine mammal survey work is being undertaken, such as passive acoustic monitoring, should be provided -responses within this document are limited to ornithology only.

A preliminary scan of Mitchell *et al*. (2004) suggests that 20 of the 25 seabirds breeding regularly in Britain and Ireland breed along the Irish east coast adjacent to the Projects (a distance of approximately 130 km between Oriel Wind Farm in the north and Arklow Bank Wind Park to the south). In taxonomic order (according to IOC, Gill *et al*. 2023) these are:

- Black-legged Kittiwake *Rissa tridactyla*
- Black-headed Gull *Chroicocephalus ridibundus*
- Common Gull *Larus canus*
- Great Black-backed Gull *Larus marinus*
- European Herring Gull *Larus argentatus*
- Lesser Black-backed Gull *Larus fuscus*
- Sandwich Tern *Thalasseus sandvicensis*
- Little Tern *Sternula albifrons*
- Roseate Tern *Sterna dougallii*
- Common Tern *Sterna hirundo*
- Arctic Tern *Sterna paradisaea*
- Common Guillemot (Common Murre) *Uria aalge*
- Razorbill *Alca torda*
- Black Guillemot *Cepphus grylle*
- Atlantic Puffin *Fratercula arctica*
- Northern Fulmar *Fulmarus glacialis*
- Manx Shearwater *Puffinus puffinus*
- Northern Gannet *Morus bassanus*
- Great Cormorant *Phalacrocorax carbo*
- European Shag *Gulosus aristotelis*

The respective foraging ranges of different seabird species from breeding colonies (see Woodward *et al*. 2019) provides an indication of the likely connectivity between colony populations and any development. As such, generic foraging ranges are a useful screening (i.e. whether EIA or HRA is required) or scoping (i.e. what needs to be assessed in EIA or HRA; see Natural Resources Wales 2021) tool. Wherever possible, generic ranges are then best refined by site-specific information for a particular species (e.g. from tracking) as this can vary considerably on an individual and colony basis from generic values (see Cleasby *et al*. 2023). Thus, not all the species from any nearby colonies may interact with any of the Projects. Equally, wider-ranging species and individuals from other colonies in Wales, England and Scotland may do so. Likely candidates include, but are not limited to Manx Shearwater, Northern Gannet, Northern Fulmar and European Storm Petrel *Hydrobates pelagicus*.

Ultimately, mapping generic and/or site-specific (where available) foraging ranges of different species from known colonies generates a list of receptors that are deemed likely to interact with any development. This list may then be further refined by site-specific survey data or additional research-based evidence (e.g. from tracking studies) that may either tend to confirm theoretical considerations or alternatively suggest some breeding species may be screened or scoped out of assessment.

This is notwithstanding that seabirds present in the footprint of a development during the non-breeding season may be dispersing from nearby breeding colonies perhaps before migrating elsewhere, as well as being on active migration to and from more remote locations, or are more generally overwintering in the area. The latter may include groups such as grebes, divers (loons) and seaduck that may otherwise breed in freshwater habitats. Regular passage (spring and/or autumn) migrant seabirds may include groups such as skuas, particularly UK breeding Great Skua *Stercorarius skua* and Arctic Skua (Parasitic Jaeger) *Stercorarius parasiticus*, species such as Little Gull *Hydrocoloeus minutus* that breed elsewhere including out of the UK, as well as species that do breed in the immediate area although this is a small fraction of a much larger range and population elsewhere (e.g. Arctic Tern).

Moreover, of the 17 species named, the majority (14) are included within the breeding species identified above, although individuals may also occur when dispersing from likely connected breeding colonies or as migrants from colonies further afield. Of the remainder, 1 (Little Gull) is a passage migrant and 2 (Red-throated Diver [Red-throated Loon] *Gavia stellata* and Great Northern Diver [Common Loon] *Gavia immer*) are likely present when wintering or possibly as passage species.

From the information presented, it is unclear if species have been named as a result of being recorded in number (perhaps above an, as yet, undefined threshold) in site-specific surveys or have also been included on the basis of theoretical considerations (e.g. foraging range from breeding colonies), specific data from research studies (e.g. the extensive tracking of Manx Shearwater – Dean *et al*. 2015, Guilford 2019) or the wider ornithological literature including local bird reports. In general, it is recommended that all available evidence is considered as sole reliance on site-specific surveys may risk the exclusion of species that are less readily sampled by particular methods with known or likely biases (e.g. seaduck or divers during boat-based surveys or petrels and shearwaters in digital aerial surveys – see Webb *et al*. 2019). This approach is recommended for migratory seabirds, which may be missed in a standard monitoring programme based on a single monthly visit.

More generally, the number of species considered to be sensitive receptors appears to be fewer than may be anticipated from initial considerations (see above), and there needs to be a clear, evidence-led justification of which species have been included or seemingly excluded, coupled with a classification of the status/period of occurrence of each of the sensitive receptors in the footprint of the Projects (i.e. as breeding, passage or wintering species), bearing in mind that this may differ between different developments depending on their characteristics such as proximity to breeding colonies or the nature of the resources available.

Further comment on the species suggested to be included in the assessment of collision risk or disturbance and displacement is respectively provided in Sections 2 and 3 below.

2 Methods

In paragraph 1.2.5 the Note states that the methodological sections provide "*a high-level description of the proposed impact methods*", although this belies the inclusion of considerable specific detail in a number of sections. In keeping with the intention of information exchange in order to promote and expedite a rigorous assessment process, the comments provided below are intentionally brief and focussed on what are considered to be key aspects.

For ease of reference, the section headings are the same as those used in the Note, albeit with different numbering hierarchy. Further headings specifically referring to the nature of the comment are then added with the relevant paragraph number in the Note also cited. Comment is then typically made after a relevant quotation taken from the Note.

2.1 Collision risk

2.1.1 Choice of method

See 2.1.1
"The Projects propose to use the Band (2012) model or the Marine Scotland Science (MSS) Stochastic Collision Risk Model Shiny Application ("sCRM App"; Donovan, 2017), which is based on the Band (2012) model."
A stochastic collision risk model based on Band (2012) to incorporate uncertainty/variability in input parameters was initially developed by Masden (2015). Marine Scotland then commissioned HiDef Aerial Surveying Limited to further develop the stochastic modelling approach (sCRM) with the specific objective of improving the collision estimates of the Band model. The sCRM was built incorporating improvements suggested by the stakeholder community and designed to be freely available as a user friendly interface in the form of Shiny App (both online https://dmpstats.shinyapps.io/avian_stochcrm/ and as a downloadable version https://github.com/dmpstats/stochCRM). On this basis, it is not clear how the use of the original Band (2012) model in its various forms may be justified.

"*Each project will provide a mean output which can be used in the cumulative/in-combination impact assessment.*"
There is a need to provide a rationale for why only the mean is to be considered; and not also uncertainty and/or variability in values.

See 2.1.5
"*The use of Band models will be selected on a project-by-project basis.*"
At face value, it is not clear if this refers to the use of the various Options in the original Band (2012) model or the equivalent Band Options available within the preferred sCRM. Moreover, for comparative purposes and ultimately for rigorous cumulative assessment, it is beneficial to use the same modelling approach. If some form of project-by project selection is undertaken, this must be clearly justified.

"Site-specific flight heights may be used to inform the proportion of birds at collision risk height (Band option 1; Band, 2012) if robust data is available from DAS or boat-based surveys."
Again, it is not clear why Band (2012) is seemingly being proposed. Nevertheless, the use of site-specific data alongside a more generic approach is an attractive option, although, as noted the data must be robust. For example, the accuracy of data should be verified (see Harwood *et al*. 2018 in relation to data gathered by observers during boat-based surveys). Moreover, flight height data delivered by photogrammetry during DAS is unlikely to be accurate, particularly for sexually dimorphic species, as variability in bird length leads to error in flight height estimation. Flight heights may also be technically

difficult to obtain data for smaller species, such as terns and Storm Petrel. Obtaining height measurements for dark-backed species such as Manx Shearwater has also proven problematic. On this basis photogrammetry is not considered a suitable methodology for obtaining flight heights by other SNCBs within the UK.

"The proposed seabird parameter values for a variety of bird species are presented in Table 2.1."
In a review of available information to improve estimates of CRM parameters, Cook *et al*. (2023) note that other key parameters such as flight speed and levels of nocturnal activity have often been drawn from studies with limited sample sizes or based on reviews inferred from an understanding of the ecology of the species concerned; specifically naming Alerstam *et al*. (2007) and Garthe & Huppop (2004) as recorded in Table 2.1. Most importantly, Masden *et al*. (2021) highlight that using such data give a misleading impression of collision risk.

Flight speed is seen to be a particularly important parameter in CRM as both the flux of birds (derived from estimated density during surveys) and estimation of the probability of collision are sensitive to it. It is important to note this sensitivity acts in opposite directions i.e. increased speed increases flux and the predicted number of collisions whereas increased speed reduces the probability of collision of birds passing through the rotor swept area; but the two do not necessarily balance out (Masden *et al*. 2021). Flight speed is also heavily influenced by the behaviour of the bird, with foraging activity being undertaken at consistently and significantly lower speed than commuting flight (Cook *et al*. 2023). GPS data collated for Northern Gannet, Black-legged Kittiwake and Lesser Black-backed Gull in the same study were also lower than current generic estimates of flight speed recommended for use in CRM.

Overall, there is a need to undertake further review and update of the information in Table 2.1, with particular emphasis on data from tracking studies.

2.1.2 Species included in CRM

See 2.1.2
As noted in 1.2.2 above, further justification is required for the selection of what would appear to be mainly breeding species and one passage species in the list of species provided; notwithstanding that 2.1.3 states that "*where species present within a project array have been excluded from CRM, rationale will be provided on species-by-species basis*". The meaning of the word "vulnerable" also needs to be explained. If this refers to the propensity of a species to fly at a height that coincides with the area occupied by rotating blades, it is noted that even species that *tend* to fly at a height lower than the sweep of turbine blades, the overall flight-height distribution may incorporate strike-height under particular conditions (e.g. higher wind speeds). Where a species is particularly numerous, modelling of collision risk may produce fatality estimates that are of concern for particular populations. Thus, care should be taken to wrongly dismiss species that are thought to be "invulnerable". Manx Shearwater is a case in point (see 3.1.4 below).

2.1.3 Collision vs displacement

See 2.1.6
It is positive to see the potential issue of collision vs displacement being considered and addressed explicitly.

"*It is the intention of all projects to account for displacement of gannet from the array area in the CRM results to avoid double counting the impact from displacement and CRM. Projects will present CRM results accounting over a range of 65 - 85% displacement (Natural England, 2022)*"
It is not clear what this means - does it mean that the displacement rate is being used to fix the avoidance rate for collision risk? Or alternatively, that the birds assumed to die from the displacement

risk are excluded from the collision risk calculations? Clarification is therefore needed on how displacement is accounted for when considering collision risk: i.e., is the avoidance rate for the CRM assumed to be equal to the displacement rate?

Moreover, as a more general point it is noted that the approach developed by Natural England accords to the high levels of displacement of Northern Gannet in the non-breeding season as a result of the results of monitoring of wind farms located away from breeding colonies. Conversely, the relatively recent increase of wind farms in areas close to breeding colonies (e.g. Hornsea relative to Flamborough Head and Filey Coast and especially Neart na Gaoithe and Seagreen in the Firth of Forth in close proximity to Bass Rock) has yet to detail the response of breeding birds that are under pressure to provision chicks and thus may be less readily displaced and conversely be more vulnerable to collision. The Projects may be anticipated to be within range of breeding birds from a number of colonies (e.g. Ireland's Eye, Great Saltee, Grassholm, Ailsa Craig and Scar Rocks.

2.2 Disturbance and displacement

2.2.1 Choice of method

See 3.1.1
"In line with general guidance, the Projects propose to use a matrix approach … in the absence of any novel models or methods, the Projects have agreed that this is the preferred solution in the Republic of Ireland"
Where data are lacking, particularly in relation to bird distribution around breeding colonies or in the over-winter period, simple methods such as the Displacement Matrix approach are likely warranted. However, several Individual Based Models (IBMs) for impacts of offshore wind have been developed for the breeding season (Searle *et al*. 2018, Warwick-Evans 2018) and non-breeding season (van Kooten *et al*. 2019, Layton-Matthews *et al*. 2023). Where sufficient data exist for implementation of these more advanced modelling approaches, guidance should consider advising the use of IBMs, potentially alongside use of the Displacement Matrix for comparison of predicted impacts.

2.2.2 Mortality rates

See 3.1.1
"*The most probable ranges for each species will be highlighted and form the basis of the impact assessment.*"
There is a need to clarify the sense in which these are "most probable", and the evidence that underpins this.
See 3.1.5
The table of mortality rates (Table 3.1) does not appear to reflect recent guidance for most of the species in both England and Scotland, in which mortality rates of up to 10% during the breeding season have been assessed for Atlantic Puffin, Razorbill, Common Guillemot and Red-throated Diver (e.g. Hornsea 2, Hornsea 3, Norfolk Boreas, East Anglia 1, East Anglia 2, East Anglia 3, Norfolk Vanguard), and up to 5% for Northern Gannet (e.g. Thanet Extension).

2.2.3 Density data

See 3.1.2
"*a weighted-mean approach to estimating abundance*"
There is a need to clarify how the weights would be calculated within this approach.
"seven-month non-breeding bio-season"

There is a need to clarify the evidence for using a seven-month non-breeding season, and how this may/will be allowed to vary across species and regions.

See 3.1.4
"Kittiwake will not be assessed for displacement because they have low habitat use specificity and have considerably large foraging ranges over which they are likely to find alternative favourable foraging habitat. Additionally, there is limited evidence that they are displaced by wind farms"
There is a need to provide evidence underpinning the assertion of low habitat use specificity. The phrase "considerably large foraging range" is unclear, and is not a simple comparison with the list of species proposed for displacement assessment that includes Northern Gannet. There is a need to clarify the 'limited evidence' for displacement more fully – there is at least *some* evidence for displacement of Black-legged Kittiwake (see Vanermen & Stienen 2019). Therefore, a precautionary approach would be to include this species in displacement assessment. Uncertainty in the extent of displacement (displacement rate) can be varied using the Displacement Matrix and Individual Based Modelling (IBM) approaches.

"Likewise Manx shearwater have vast foraging ranges and have very low vulnerability to displacement by offshore wind farms, scored 1 by Bradbury et al. (2014) and given a species concern index value of 2 by Furness et al. (2013)."
The intention to not consider Manx Shearwater belies the fact that the stratified waters of the Western Irish Sea or more specifically Dundalk Bay, are utilised by individuals from multiple major colonies of the species including Skomer (Wales), Rum (Scotland), Copeland (Northern Ireland) and Lundy (England) (Dean *et al*. 2015, Guilford 2019). In fact, Dundalk Bay may be the most important foraging area for the species in British and Irish waters (T. Guilford, University of Oxford pers comm). The importance of the area may be linked to the presence of the Mourne Atlantic Herring *Clupea harengus* stock known to spawn in Dundalk Bay as well as the Manx Atlantic Herring stock known to spawn on the southern and eastern sides of the Isle of Man. The extremely large numbers of birds that may occur in the Western Irish Sea and interacting with the Projects means that even a low rate of displacement especially in a cumulative context may affect a large number of birds and potentially even induce a population-scale impact. It should also be clear that any "scores" that have been developed are theoretical and not currently supported by empirical evidence, primarily as too few wind farms have yet been built in waters occupied by large numbers of breeding Manx Shearwaters.

The likely interaction between Manx Shearwater and its potential prey resource considered above also provides further insight into the underlying reasons for displacement, which are currently poorly understood (Perrow 2019). However, changes in the distribution and abundance of important fish prey, especially small, lipid-rich pelagic 'forage fishes' such as sandeels *Ammodytes* spp. and clupeids (e.g. Atlantic Herring and European Sprat *Sprattus sprattus*) may be especially important in driving any patterns of displacement. For this reason, consideration of ecosystem effects across all trophic levels should be incorporated into assessment.

2.2.4 Barrier effects

See 3.2.1
"In general, it is acknowledged that the displacement assessment captures much of the potential impact from barrier effects. However, individual projects may provide a further analysis of the possibility that barriers to movement could have a detrimental effect on populations"
Details on what further analyses are intended should be provided here. Note that IBMs distinguish barrier effects from displacement, in contract to the Displacement Matrix.

2.3 Breeding seasons

2.3.1 Definition of season

See 4.1.1
"However, projects are likely to redefine seasons for some species if obvious trends are found within the site-specific survey data (e.g. early post-breeding migration is detected)."
It is unclear what analyses are proposed here to establish whether Furness is appropriate to use – more details are required.

2.4 Apportionment

The relatively detailed description of methods that is given for apportioning is very useful.

2.4.1 Breeding season method for apportioning

See 5.2.1 & 5.2.2
"Apportioning impacts from the Projects to specific designated (breeding) seabird populations during the breeding season is to be undertaken using the interim guidance from NatureScot, (2018)"
It should be clarified as to whether the weights are rescaled to sum to one in the apportioning advice.
It should also be clarified as to whether the distance from colony is distance by sea (e.g., avoiding land), and how this should be handled for species with inland breeding colonies (e.g., gulls).
Finally, where viable, other apportioning methods should be considered. Specifically, the use of local GPS tracking data, or predictive colony-level utilisation distributions based on a habitat distribution modelling approach (*sensu* Wakefield *et al*. 2017).

2.4.2 Colony population sizes

"*Where more than one colony count is available during the baseline survey years, the average of all counts will be used. All counts will be converted into the number of individual breeding adults*."

Consideration should be given to using the maximum of multiple counts for colony sizes, rather than the mean, as this would be more precautionary. Specific advice should also be provided for how counts should be converted to the number of breeding adults when counts of birds are not conducted with those units (e.g. Common Guillemots and Razorbills).

2.4.3 Non-breeding season method for apportioning

See 5.3.2
Because "*Proportion of population that remain during season*" in the equation can vary between populations within BDMPS, it is unclear how the formula (which refers to this as being a single value) would be used in practice, and of the rationale for the formula itself. Rather, should the proportion of population that remain be multiplied by population size, separately for each population, and apportioning then be based on dividing by the sum of this product across all populations?

2.5 Population viability analysis (PVA)

2.5.1 Use of PVA

See 6.1.2
"*With up to 5,000 simulations*"
It is more appropriate to give an exact or minimum number of simulations required.

2.6 Migratory non-seabirds and seabirds

2.6.1 Screening

See 7.1
"*Initially, individual projects will complete a screening exercise to identify any migratory species that may pass through or nearby to their array area and screen out those that were unlikely to pass through the array in any meaningful numbers*."
A screening exercise using all available evidence is welcomed (see 1.2.2 above) understanding that there are a range of designated sites supporting migratory species, in particular Light-bellied Brent Goose. Consultation with BirdWatch Ireland should be undertaken to ensure relevant reports and literature are obtained.

2.6.2 The SOSS Approach

See 7.2.1
"Assessments will follow the British Trust for Ornithology's (BTOs) Strategic Ornithological Support Services (SOSS) '05' project approach to assessment for migratory seabirds (Wright et al., 2012) as a modelling tool to quantify any risk to migrating birds."
The use of the SOSS approach may be advanced or reconsidered given the recent initiative by the Scottish Government to undertake strategic study of collision risk for birds on migration including the further development of the sCRM. At least Work Package 1: Strategic review of birds on migration in Scottish waters is available (Woodward *et al.* 2023).

3 Responses to Questions

Responses to the questions raised are given below:

1. *Do you agree with the collision risk species proposed by the Projects and the range of methods specified?*

   As indicated in Sections 2.1.2, further explanation is needed around the rationale used for defining 'vulnerable' species, and the data and evidence that have been used need to be clarified. For example, if flight height is the main determinant of 'vulnerability', it should be noted that significant impacts on species that typically fly below strike height may still result if birds occur in abundance. Therefore, further information on how this list has been derived is required to assess whether the decisions made are reasonable.

2. *Do you agree with the input parameters provided for CRM?*

   As stated in Section 2.1, there is a need to undertake further review and update of the information in Table 2.1, with particular emphasis on data from tracking studies, especially in relation to parameters such as flight speed, where the values utilised may significantly impact the outputs. It would be helpful to understand whether the values presented in Table 2.1 represent maximum values (length, wingspan etc) or mean values.

3. *Do you agree with the displacement risk species and parameters proposed by the Projects?*

   We note that the intention is for species to be assessed for displacement "to be selected on a project-by-project basis" but acknowledging the approach outlined in Section 3. Whilst this provides a starting point, further information is necessary to establish whether the risk species and parameters are reasonable. The following points need to be addressed:

   - Data sources used to collate Table 3.1 should be stated as some of the values presented do not reflect recent casework (see Section 2.2.2).
   - Caution is recommended in utilising scoring systems such as Bradbury *et al* 2014, and it is recommended that the outputs are sense-checked, and the points raised relating to Kittiwake and Manx Shearwater are addressed (see Section 2.2.3).
   - Use of Individual Based Models (IBMs), where feasible, would be welcomed.
   - Further detail around how barrier effects will be assessed is required.
   - Consideration is needed regarding how cumulative displacement impacts will be assessed both amongst the projects and in combination with other developments (existing and planned) which may impact on the same species. Transboundary impacts on designated sites should also be considered. Cumulative impact assessment is currently not addressed within the document supplied.

4. *Do you know of any guidance updates or have any concerns about the assessment methodologies or parameters used?*

   In general, the developer-led collaborative approach to standardise assessment methods is welcomed. Specific concerns around the proposed assessment methodology are summarised below:

- Further information on how underpinning datasets will be aligned is needed if survey techniques differ between projects (see 1.2.1).
- It is not clear from the Note if screening and/or scoping has already been specifically undertaken, or is intended, for breeding seabirds. This is notwithstanding that an intention to undertake a screening exercise for “migratory non-seabirds and seabirds” is declared in 7.1.1. As such, there is no clear justification to explicitly name 17 seabird species in the Note as “vulnerable” receptors to be considered in either collision (12 species) or displacement (6 species) with only 1 species (Northern Gannet) included as subject to both effects.
- Use of a standardised collision modelling approach using the most recent version of the model is recommended across all sites to ensure that impacts are assessed in a consistent manner. If alternative methods are required later, justification can be provided and discussed on a case-by-case basis. Further information on the proposed input parameters is needed (see response to Question 2).
- Further information is required in relation to the displacement assessment methods proposed. Requirements are specified in the response to Question 3 above.
- It is unclear whether Furness is appropriate to use to define bio-seasons, and clarification is required.
- Clarity is needed on each of the points raised in Section 2.4.
- In relation to migratory non-seabirds and seabirds, it is recommended that the recent initiative by the Scottish Government to undertake strategic study of collision risk for birds on migration could be considered (see Woodward *et al*. 2023).
- Details are needed in relation to how cumulative impacts will be assessed.

4 Conclusions

The objective of the method statement, of ensuring that different projects use comparable methods, is to be welcomed, as is the consultation with stakeholders.

Overall, however the current document requires more explicit recognition of the importance of the transparency of the proposed methodology, particularly in relation to the evidence-base used to underpin the requirements. In general, a more comprehensive description of the underpinning scientific evidence and rationale behind the proposed methodology is needed to establish whether the approach is reasonable. Information is also needed to understand how cumulative impacts will be assessed.

Discussion of mitigation measures to reduce potential adverse impacts on birds would be welcomed. Mitigation could include site design elements, for example spacing turbines further apart may increase permeability to birds, reducing displacement (see Van Bemmelen *et al* 2023). Leaving flight corridors for birds may reduce the severity of displacement impacts by allowing birds a safe route through the wind farm. The size and orientation of the site should be considered in relation to known flight paths of birds to and from coastal colonies, and if feasible, adjusted to ensure that displacement impacts are minimized in so far as they can be. Painting turbine blades (see May *et al* 2020, ABPmer 2023) and use of curtailment systems[5] provide potential options to reduce bird collisions. When available, the outputs of Defra's Offshore Wind Environmental Standards should be considered.

If the possibility of an adverse effect on site integrity cannot be ruled out, Article 6(4) of the EU Habitats Directive requires that compensatory measures are required. For the development to go ahead, it is necessary to make a case that there is an Imperative Reason of Overriding Public Interest (IROPI), demonstrating that there is no alternative to the project. Since seabird compensation is a relatively new consideration for offshore wind, early investigation of potential compensatory measures is recommended.

5 There are now a number of different curtailment systems available commercially, many of which are routinely used offshore.

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