



Awel y Môr Offshore Wind Farm

Category 5: Reports

RIAA Annex 5: Ornithology Apportioning Note

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1 Awel y Môr Apportionment Methodology Note – Breeding Season

1.1 Introduction

- 1.1.1 This note provides an example of the breeding season apportioning process undertaken for the Awel y Môr ornithological assessment. This document is submitted to provide clarification with regards to the approach to appointment adopted in the Report to Inform Appropriate Assessment (Application Ref: 5.2).
- 1.1.2 A programme of 24 monthly aerial digital video surveys of the Awel y Môr array area and up to 4km buffer provide data used to characterise the abundance and distribution of seabirds to inform risk of the potential impacts at both an Environmental Impact Assessment (EIA) and Habitats Regulations Assessment (HRA) level. However, in order to assess the effects on integrity of specific Special Protection Areas (SPAs), it is necessary to estimate the proportion of birds that suffer impacts from Awel y Môr which can be determined to be breeding adults from SPAs of interest.
- 1.1.3 The population of seabirds changes throughout the seasons. During the breeding bio-season, breeding adults are limited in the distance and number of days over which they can forage by the need to return regularly to the nest site, therefore, it can be expected that a high proportion of adult birds effected by offshore wind farm impacts can be attributed to colonies within foraging range, including those which are designated within SPAs. There is therefore the potential for offshore wind farms to have a negative effect on the integrity of SPAs within foraging range of the offshore wind farm site during the breeding season.
- 1.1.4 Outside of the breeding bio-season, the population of birds contains a mix of individuals from UK breeding colonies and from further away, therefore, a much lower percentage of birds can be attributed to any particular breeding colony SPA population. As the populations of seabirds that have the potential to be within the vicinity of the offshore wind farm site changes between season, and therefore, the impact on SPA colonies changes, the assessment is carried out on a seasonal basis. The proposed approach to assessment of potential impacts during the breeding season is described below, with worked examples.

1.2 Methodology

Breeding season

- 1.2.5 Apportioning impacts from Awel y Môr to specific SPA (breeding) seabird populations is to be undertaken during the breeding season using the current best practice interim guidance from NatureScot (formally known as Scottish Natural Heritage) (2018)¹; this guidance is understood to be recognised as the most appropriate guidance for the purposes of the Awel y Môr assessment. The guidance calculates an estimated proportion of breeding adults associated with each colony based on the following parameters:

- The population size of each colony;

¹ <https://www.nature.scot/doc/interim-guidance-apportioning-impacts-marine-renewable-developments-breeding-seabird-populations>

- The distance from each colony (geometric centre) to Awel y Môr (geometric centre); and
- The proportion of sea within the mean-maximum foraging range (MMF) or mean-maximum foraging range +1 Standard Deviation (SD) of the colony.

- 1.2.6 NatureScot (2018) guidance states using the following equation for apportioning calculations;

$$\text{Weight} = (\text{Colony Population} / \text{Sum of Populations}) * (\text{Sum of Distance}^2 / \text{Colony Distance}^2) * (1/\text{Colony Sea Proportion} / \text{Sum of } 1/\text{Sea Proportions}).$$
- 1.2.7 Further rationale on the approach is given in the NatureScot guidance (NatureScot, 2018).
- 1.2.8 The NatureScot guidance (NatureScot, 2018) suggests including colonies in the apportioning calculations that are within the mean-maximum foraging range of the species (using Woodward *et al.*, 2019), however there are additional SPA sites screened into assessment that are beyond mean-maximum foraging range but within one standard deviation (+1SD). It would not be appropriate to include all colonies within mean-maximum +1SD foraging range as this would dilute impacts to colonies closer to the Awel y Môr site where most impacts are likely to come from. However, it would also not be appropriate to apportion all impacts from Awel y Môr to each of those SPAs within one standard deviation, as this would be extremely unlikely. It has therefore, been deemed appropriate to include all colonies (all SPA and non-SPA) within mean-maximum foraging range and additionally those SPA colonies within mean-maximum foraging range +1SD. This is a precautionary approach as breeding adults apportioned to a small number of colonies compared to including colonies from further distance means that estimated impacts on the (closer/at risk) colonies will be higher.

Colony population sizes

- 1.2.9 Colony sizes were based on data provided in the Seabird Monitoring Programme Database (JNCC, 2020), with data used from the year/s corresponding to the baseline surveys (2019-2020) or the closest year available. Where more than one colony count was available between 2019 and 2020, the average of all counts was used. All counts were converted into the number of individual breeding adults, for example where count was apparently occupied nest then this was multiplied by two, to determine the number of adult breeding individuals from each colony.

Distance from colony to Awel y Môr

- 1.2.10 Distances were calculated using ArcGIS and were measured from geometric centre of the colony to geometric centre of Awel y Môr. Where there were multiple colonies for an SPA within mean-maximum foraging range or mean-maximum foraging range +1SD then each colony was considered separately, therefore distances were based on the centre of each colony rather than the centre of the SPA. Note that assessing from geometric centre is the proposed approach given within the NatureScot (2018) apportioning guidance, however where sites are within MMF+1SD from edge of colony to edge of array, however are beyond MMF+1SD when going from centre to centre, these SPAs are still included in the apportioning analysis.

Proportion of sea within foraging range

- 1.2.11 The area of suitable foraging habitat within the sea for each species from each colony was calculated as follows: using ArcGIS, a buffer around each colony was drawn for each species which equaled their mean-maximum foraging range or mean-maximum foraging range +1SD. The foraging area used was sea only for all species, therefore excluded any land, estuaries or freshwater bodies of water. Where areas of sea were within foraging range from the colony by straight line but were further than foraging range when assuming birds only travel over sea, these areas were excluded manually. The resultant area was then converted into a proportion by dividing the area of the circle with radius equal to the foraging range.
- 1.2.12 The above parameters give a resultant weighting for each colony within foraging range. In order to then calculate the proportion of impact consequent mortalities that would be attributed to each SPA the NatureScot apportioning tool (NatureScot, 2018) requires the number of breeding adults that are impacted by the offshore wind farm. However, there is currently no guidance provided on how to estimate this number from the survey data. During surveys, abundance of birds observed included immatures and juveniles as well as breeding and non-breeding (sabbatical) adults. For gannet, site-specific adult age proportions have been used in the apportionment process, for all other species, generic proportions of adult birds in the breeding season were taken from Furness (2015).
- 1.2.13 This then gives a resultant proportion of mortalities for each colony. Where an SPA consists of more than one colony, the total number of birds apportioned to that SPA is the sum of birds apportioned to each constituent colony.

1.3 Gannet apportioning worked example (Awel y Môr)²

Table 1. Worked example of apportioning gannet collision mortalities to colonies during the migration-free breeding season (April to August).

SPA name	Count of adult birds at colony (individuals)	Distance from colony to development (km)	Proportion of foraging range as sea	1/P(Sea)	Resulting weight for colony	Proportional weight of colony	Mortalities apportioned to breeding adults from each colony
Grassholm	72022	227	0.4924	2.030869	0.260	0.367	4.21
Great Saltee Island	4892	253	0.478818	2.088476	0.015	0.021	0.24
Ireland's Eye	690	152	0.309781	3.228087	0.009	0.012	0.14
Lambay	1852	148	0.301941	3.311905	0.026	0.036	0.42
Big Scar	4752	147	0.282006	3.546024	0.071	0.101	1.16
Ailsa Craig	66452	231	0.348788	2.867071	0.327	0.462	5.29
Total	150660	1158	2.214	17.072	0.707	1.00	11.45578
Breeding season collision	12.187						
Proportion adults	0.94						
Adult collisions	11.45578						

² Note that the data presented here is using the Applicant's CRM output for Band Option 2 during 24 months of survey data. The proportion of adults is taken from site specific survey data.

1.3.14

1.4 References

Furness, R.W. (2015). Non-breeding season populations of seabirds in UK waters: Population sizes for Biologically Defined Minimum Population Scales (BDMPS). Natural England Commissioned Reports, Number 164.

JNCC. 2020. Seabird Monitoring Programme Report 1986–2018. <https://jncc.gov.uk/our-work/smp-report-1986-2018/>.

NatureScot. (2018). Interim Guidance on Apportioning Impacts from Marine Renewable Developments to Breeding Seabird Populations in Special Protection Areas.

Woodward, I. et al. (2019). Desk-based revision of seabird foraging ranges used for HRA screening. BTO research report number 724. Thetford.



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