Awel y Môr Offshore Wind Farm

Marine Ornithology Great Orme Assessment

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Contents

Figures

Tables

1 Overview

1 This Clarification Note has been produced by the Applicant in response to the comments received from Natural Resource Wales (NRW) within their Relevant Representation (RR-015) in relation to ornithological matters associated with the Pen-y-Gogarth / Great Orme Site of Special Scientific Interest (SSSI). The specific response received from NRW on this matter being as follows:

"NRW advises that a detailed assessment of the potential impacts of the project on the breeding seabird features of Pen-y-Gogarth / Great Orme's Head SSSI (guillemots, razorbills and black-legged kittiwakes) should be undertaken, as currently this has not been done sufficiently to assess effects on these features."

2 The Applicant has since engaged further with NRW following receipt of the Relevant Representations, through a consultation meeting held virtually on 6th September 2022, to establish a way forward on this matter. The outcome of the consultation meeting was that both parties recognise that the existing assessments provided at the point of application within the Environmental Statement (ES) Document 6.2.4, Volume, Chapter 4: Offshore Ornithology of the ES Chapter (APP-050) did not consider birds specifically associated with the SSSI and that no bespoke assessment of the Pen-y-Gogarth / Great Orme's Head SSSI's colonies was undertaken (as the Environmental Impact Assessment (EIA) was undertaken at a larger scale linked to the relevant biologically defined minimum population scales (BDMPS) for each species). Notwithstanding this, and to enable NRW to have a better understanding of the potential impacts from Awel y Môr offshore wind farm (OWF) (hereafter referred to as AyM) of features specifically associated with the Pen-y-Gogarth / Great Orme's Head SSSI, the Applicant has produced this Clarification Note that presents such an assessment.

3 This report focuses on those species from the Pen-y-Gogarth / Great Orme's Head SSSI that were identified by NRW within their Relevant Representation (RR-015), namely black-legged kittiwake (*Rissa tridactyla*) (here on in referred to as kittiwake), guillemot (*Uria aalge*) and razorbill (*Alca torda*). In order to ascertain the magnitude of any impacts on these seabirds and the significance of any potential effect from AyM on these species from the Pen-y-Gogarth / Great Orme's Head SSSI colonies a population viability assessment (PVA) was undertaken.

4 Natural England provide an online Seabird PVA Tool, which can be used for such studies (Searle *et al.*, 2019). The PVAs undertaken for AyM at the point of application (APP-100) were parameterised with agreed values from the Expert Technical Group (ETG) for offshore ornithology at the ES stage, with advice received from NRW, Natural England, and the Royal Society for the Protection of Birds (RSPB), for the assessment of certain ornithological effects on a number of sites designated at the European level. The same parameterisation approach is applied to the PVA for the assessments considered within this report, with some minor changes following consultation and agreement with NRW during a virtual meeting held on 6 September 2022.

5 Outputs of the Seabird PVA Tool are summarised within this report to indicate whether the model predicts significant changes in the counterfactual growth rate and counterfactual population size of the species associated with the Pen-y-Gogarth / Great Orme SSSI.

2 Methods

2.1 PVA Tool

6 The Seabird PVA Tool provides a method for running Leslie Matrix models on selected populations to compare how population predictions may vary between impacted and unimpacted populations (Searle *et al.*, 2019).

7 The Seabird PVA Tool was parameterised using the same approach to that described in the AyM ES Document 6.4.4.6, Volume 4, Annex 4.6: Offshore Ornithology PVA (APP-100). Pre-set demographic values are available for a total of 15 different seabird species, including all three species considered in this report. The values are derived from previously reported national or colony specific demographic parameters sourced from the Joint Nature Conservation Committee (JNCC) Seabird Monitoring Programme (SMP, 2020), divided into eight regional classifications (further information on the eight regional classifications can be found in Mobbs et al. (2020)) for breeding success data or Horswill and Robinson (2015) for survival rate. Upon review and agreement with appropriate bodies, the national productivity values available within Horswill and Robinson (2015) were instead used for assessment, due to providing a more representative productivity rate of the populations assessed.

8 The Seabird PVA Tool can optionally be run using density dependant or density independent models. Density dependant approaches are more likely to be biologically realistic as populations are constrained in their growth by environmental factors (food supply, space at colony etc.). However, this requires appropriate and careful specification of the biological mechanisms and therefore outputs may be present traits of specification rather than useful results. Density independent methods do not have this issue, and therefore are a slightly more robust approach for contrasting populations.

9 The Seabird PVA Tool is also capable of utilising stochastic modelling approaches, which enable environmental and demographic stochasticity to produce estimates with associated confidence intervals for assessments.

10 For these reasons, the Seabird PVA Tool was set up to be run with environmental and demographic stochasticity, but using a density independent approach. This approach is the same as detailed within the AyM ES, Document 6.4.4.6, Volume 4, Annex 4.6: Offshore Ornithology Population Viability Analysis (APP-100).

11 The model was run with 5,000 simulations for a period of 30 years, with a 10-year burn-in period to ensure a stable population matrix structure had been calculated by the model. Population sizes were obtained from the most recently available count data on the SMP online portal (SMP, 2020).

12 Collision risk and displacement mortality impact assumptions from the AyM ES Document 6.2.4, Volume, Chapter 4: Offshore Ornithology of the ES Chapter (APP-050) were inputted as absolute harvest values into the PVA tool to act as the impact parameters.

2.2 Species specific inputs

13 Details of the species-specific parameters used for running the Seabird PVA Tool are presented in Table 1. Use of generic national parameters available from Horswill & Robinson (2015) were agreed with the NRW. Species count data was obtained from the most recent population count data available for the Pen-y-Gogarth / Great Orme SSSI. For the correct interpretation of the PVA outputs, it is important to note that the species detailed in this report are counted using different methods. Guillemot (2,322) and razorbill (254) and counted as individuals, whilst kittiwake (780) are recorded as the number of active nests which can be assumed to be multiplied by two to account for a breeding pair (or two individuals) being associated with each nest.

Table 1: Species demographic parameter values obtained from Horswill & Robinson (2015), as agreed for use within the AyM assessment materials due to data reliability concerns.

SPECIES	DEMOGRAPHIC PARAMETER	VALUE
Kittiwake	Productivity ± SD	0.690 ± 0.296
	Survival ± SD	0.870 ± 0.057
	Impact value	3.54
Razorbill	Productivity ± SD	0.570 ± 0.247
	Survival ± SD	0.895 ± 0.067
	Impact value	0.16
Guillemot	Productivity ± SD	0.672 ± 0.174
	Survival ± SD	0.939 ± 0.015
	Impact value	1.63

3 Results

14 Graphical outputs from the PVA analysis are presented here. Yearly break down of the PVA outputs of counterfactual growth rate and counterfactual population size for each of the three species are presented in Table 2.

15 The use of counterfactual population size as metric to assess the outputs of density independent models is likely to produce outputs which are over-estimates of population impact as there is no method for populations to recover within the model. It is therefore considered appropriate for the assessments to prioritise the counterfactual growth rate as this population metric is less impacted by density independence in the model over time and therefore is likely more appropriate to consider what affect any potential impacts from a wind farm development may have.

3.1 Kittiwake

16 The PVA outputs for kittiwake indicate a change less than 1% in the final counterfactual of growth rate of the Pen-y-Gogarth / Great Orme SSSI population after the accounting for the potential impact via collisions from AyM, which is not significant. The counterfactual of final population size shows a 1.9% decrease in population size relative to the unimpacted population size by the end of the 30-year lifespan of the AyM project, though both populations remain in growth and end with significantly higher populations in comparison to the current level.

17 The change in counterfactual of final population size is most likely a trait of the population model, with the relatively low number of estimated birds affected likely to recover through normal population dynamics, which are not included within the model.

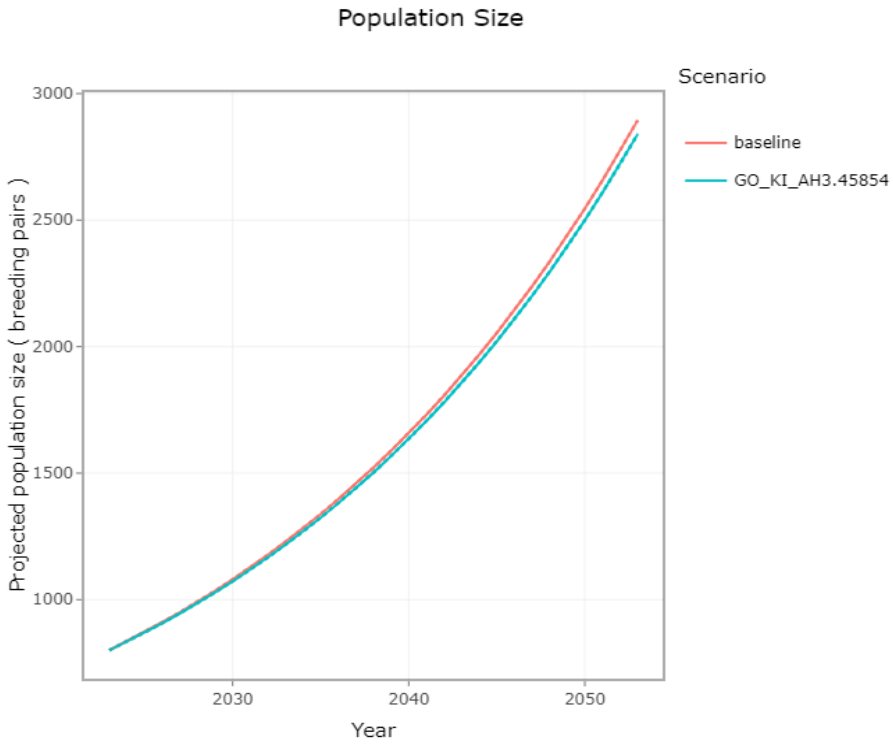

Figure 1: Population trajectory from the PVA model run showing the baseline and impacted population estimates over 30 years.

3.2 Razorbill

18 Razorbill show no differences between the baseline population and the population affected by displacement from AyM for the Pen-y-Gogarth / Great Orme SSSI population in either final counterfactual of growth rate or counterfactual of final population size. This is likely due to the low percentage of affected birds that are apportioned to the Pen-y-Gogarth / Great Orme SSSI population at the apportioning stage. Subsequently, population trajectories are an exact match for each other (Figure 2).

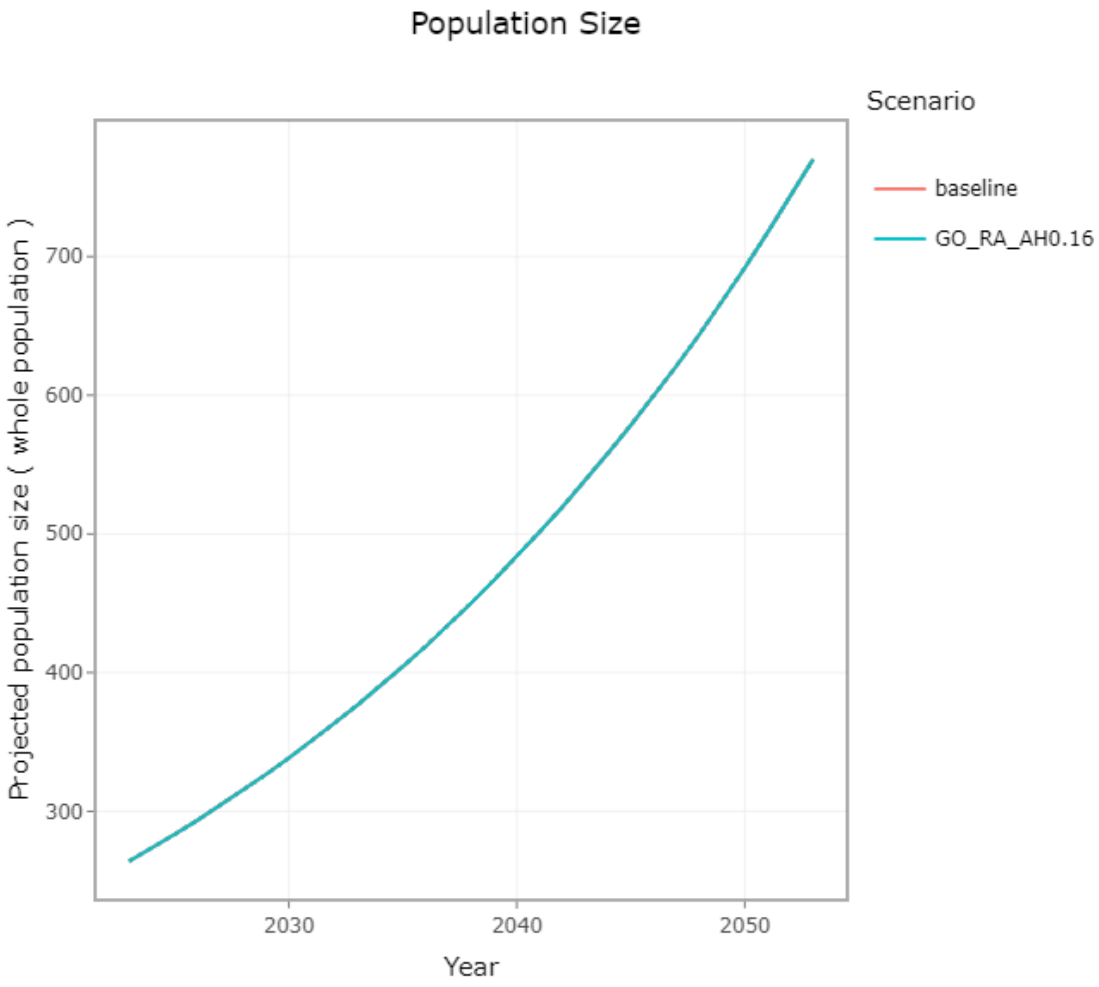

Figure 2 Population trajectory from the PVA model run for Razorbill showing the baseline and impacted population estimates over 30 years

3.3 Guillemot

19 The final counterfactual growth rate for guillemot remained below 0.1% across the 30-year model run with the counterfactual of final population size remaining below a 1% change between the baseline and impacted population. It is therefore expected that there will be no significant impact on the population of guillemot within the Pen-y-Gogarth / Great Orme SSSI.

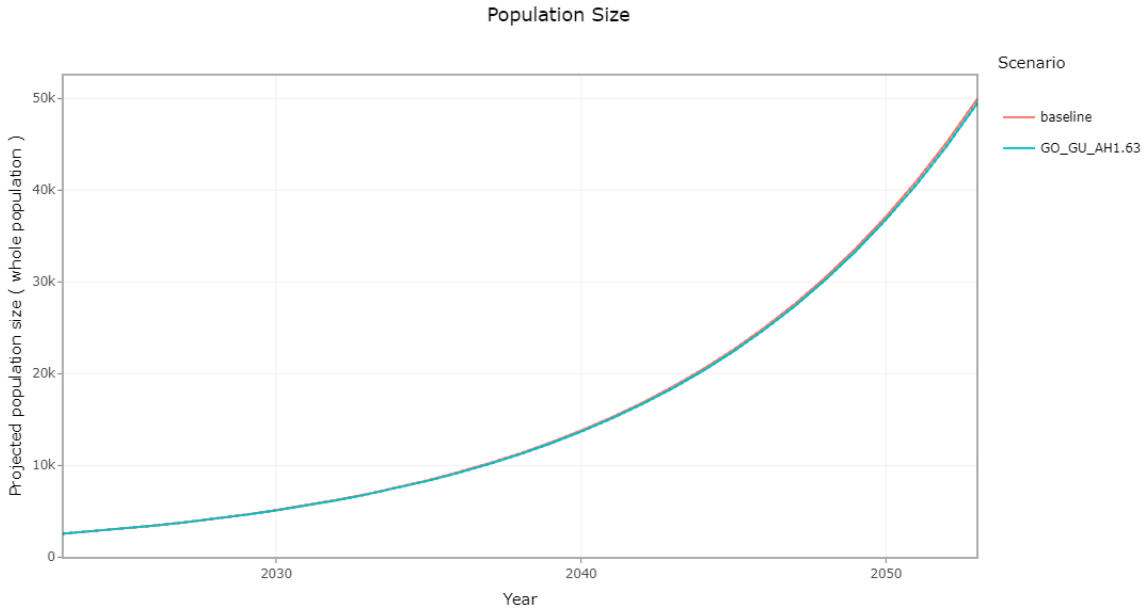

Figure 3. Population trajectory from the PVA model run for Guillemot showing the baseline and impacted population estimates over 30 years.

Table 2: Seabird PVA Tool outputs for the counterfactual of growth rate and counterfactual of population size for kittiwake, guillemot and razorbill.

YEAR	COUNTERFACTUAL GROWTH RATE MEAN (WITH SD)			COUNTERFACTUAL POPULATION SIZE (WITH SD)		
	KITTIWAKE	RAZORBILL	GUILLEMOT	KITTIWAKE	RAZORBILL	GUILLEMOT
2023	0.999 ± 0.0005	1.000 ± 0.000	0.999 ± 0.0001	0.999 ± 0.0005	1.000 ± 0.0000	0.999 ± 0.0001
2024	0.999 ± 0.0003	1.000 ± 0.000	0.999 ± 0.0001	0.998 ± 0.0006	1.000 ± 0.0000	0.998 ± 0.0002
2025	0.999 ± 0.0002	1.000 ± 0.000	0.999 ± 0.0001	0.997 ± 0.0007	1.000 ± 0.0000	0.997 ± 0.0002
2026	0.999 ± 0.0002	1.000 ± 0.000	0.999 ± 0.0001	0.996 ± 0.0007	1.000 ± 0.0000	0.996 ± 0.0003
2027	0.999 ± 0.0001	1.000 ± 0.000	0.999 ± 0.0001	0.995 ± 0.0006	1.000 ± 0.0000	0.996 ± 0.0003
2028	0.999 ± 0.0001	1.000 ± 0.000	0.999 ± 0.0001	0.994 ± 0.0006	1.000 ± 0.0000	0.995 ± 0.0003
2029	0.999 ± 0.0001	1.000 ± 0.000	0.999 ± 0.0000	0.993 ± 0.0006	1.000 ± 0.0000	0.995 ± 0.0003
2030	0.999 ± 0.0001	1.000 ± 0.000	0.999 ± 0.0000	0.993 ± 0.0006	1.000 ± 0.0000	0.995 ± 0.0003
2031	0.999 ± 0.0001	1.000 ± 0.000	0.999 ± 0.0000	0.992 ± 0.0006	1.000 ± 0.0000	0.994 ± 0.0003
2032	0.999 ± 0.0001	1.000 ± 0.000	0.999 ± 0.0000	0.991 ± 0.0006	1.000 ± 0.0000	0.994 ± 0.0003
2033	0.999 ± 0.0001	1.000 ± 0.000	0.999 ± 0.0000	0.990 ± 0.0006	1.000 ± 0.0000	0.994 ± 0.0003

YEAR	COUNTERFACTUAL GROWTH RATE MEAN (WITH SD)			COUNTERFACTUAL POPULATION SIZE (WITH SD)		
	KITTIWAKE	RAZORBILL	GUILLEMOT	KITTIWAKE	RAZORBILL	GUILLEMOT
2034	0.999 ± 0.0000	1.000 ± 0.000	0.999 ± 0.0000	0.990 ± 0.0006	1.000 ± 0.0000	0.993 ± 0.0003
2035	0.999 ± 0.0000	1.000 ± 0.000	0.999 ± 0.0000	0.989 ± 0.0006	1.000 ± 0.0000	0.993 ± 0.0003
2036	0.999 ± 0.0000	1.000 ± 0.000	0.999 ± 0.0000	0.988 ± 0.0006	1.000 ± 0.0000	0.993 ± 0.0003
2037	0.999 ± 0.0000	1.000 ± 0.000	0.999 ± 0.0000	0.988 ± 0.0005	1.000 ± 0.0000	0.993 ± 0.0003
2038	0.999 ± 0.0000	1.000 ± 0.000	0.999 ± 0.0000	0.987 ± 0.0005	1.000 ± 0.000	0.992 ± 0.0003
2039	0.999 ± 0.0000	1.000 ± 0.000	0.999 ± 0.0000	0.987 ± 0.0005	1.000 ± 0.000	0.992 ± 0.0004
2040	0.999 ± 0.0000	1.000 ± 0.000	0.999 ± 0.0000	0.986 ± 0.0005	1.000 ± 0.000	0.992 ± 0.0004
2041	0.999 ± 0.0000	1.000 ± 0.000	0.999 ± 0.0000	0.986 ± 0.0005	1.000 ± 0.000	0.992 ± 0.0004
2042	0.999 ± 0.0000	1.000 ± 0.000	0.999 ± 0.0000	0.985 ± 0.0005	1.000 ± 0.000	0.992 ± 0.0004
2043	0.999 ± 0.0000	1.000 ± 0.000	0.999 ± 0.0000	0.985 ± 0.0005	1.000 ± 0.000	0.992 ± 0.0004
2044	0.999 ± 0.0000	1.000 ± 0.000	0.999 ± 0.0000	0.984 ± 0.0005	1.000 ± 0.000	0.991 ± 0.0004
2045	0.999 ± 0.0000	1.000 ± 0.000	0.999 ± 0.0000	0.984 ± 0.0005	1.000 ± 0.000	0.991 ± 0.0004

YEAR	COUNTERFACTUAL GROWTH RATE MEAN (WITH SD)			COUNTERFACTUAL POPULATION SIZE (WITH SD)		
	KITTIWAKE	RAZORBILL	GUILLEMOT	KITTIWAKE	RAZORBILL	GUILLEMOT
2046	0.999 ± 0.0000	1.000 ± 0.000	0.999 ± 0.0000	0.983 ± 0.0005	1.000 ± 0.000	0.991 ± 0.0004
2047	0.999 ± 0.0000	1.000 ± 0.000	0.999 ± 0.0000	0.983 ± 0.0005	1.000 ± 0.000	0.991 ± 0.0004
2048	0.999 ± 0.0000	1.000 ± 0.000	0.999 ± 0.0000	0.983 ± 0.0005	1.000 ± 0.000	0.991 ± 0.0004
2049	0.999 ± 0.0000	1.000 ± 0.000	0.999 ± 0.0000	0.982 ± 0.0005	1.000 ± 0.000	0.991 ± 0.0004
2050	0.999 ± 0.0000	1.000 ± 0.000	0.999 ± 0.0000	0.982 ± 0.0005	1.000 ± 0.000	0.991 ± 0.0004
2051	0.999 ± 0.0000	1.000 ± 0.000	0.999 ± 0.0000	0.982 ± 0.0005	1.000 ± 0.000	0.991 ± 0.0004
2052	0.999 ± 0.0000	1.000 ± 0.000	0.999 ± 0.0000	0.981 ± 0.0005	1.000 ± 0.000	0.991 ± 0.0004
2053	0.999 ± 0.0000	1.000 ± 0.000	0.999 ± 0.0000	0.981 ± 0.0005	1.000 ± 0.000	0.991 ± 0.0004

4 Conclusions

20 The PVA outputs for guillemot and razorbill indicate that there is no risk to population status of those species at the Pen-y-Gogarth / Great Orme SSSI.

21 The PVA outputs for kittiwake indicate that there is limited effect when assessing using the final counterfactual of growth rate metric for the Pen-y-Gogarth / Great Orme SSSI breeding birds. The counterfactual of final population size indicates the there is a potential for the population to be 1.9% lower by the end of the 30-year period compared to the unimpacted population size. However, under both the impacted and unimpacted scenarios, the kittiwake population is still expected to grow significantly compared to the current population. The use of counterfactual of final population size within a deterministic model is problematic as the metric is dependant and therefore not as robust as using the final counterfactual of growth rate. For example, if the outputs were assessed at the 15-year point the counterfactual of growth rate metric would report the same decrease of 0.1%, while the counterfactual of population size would return a 1.3% lower population size.

22 Given that the growth rate metric is the more robust assessment approach, the results indicate that the impact of AyM on the kittiwake population at the Pen-y-Gogarth / Great Orme SSSI is not a cause for concern, with only a small deviation from the unimpacted growth rate.

23 Therefore, with regards to all three species assessed (kittiwake, guillemot and razorbill) from the Pen-y-Gogarth / Great Orme SSSI colonies there is no potential for a significant effect in relation to potential displacement or collision risk impacts from AyM and therefore, subject to natural change, all three species will be maintained as features in the long term with respect to the potential for adverse effects from displacement or collision risk.

5 References

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