



Berwick Bank Wind Farm

Additional Environmental Information (AEI) Submission

**AEI02: Addendum to the Derogation Case
Section 4 Dunbar Colony Measures**

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Acronyms

Acronym	Description
AEI	Additional Environmental Information
CCM	Colony Compensatory Measures
EIA	Environmental Impact Assessment
IMP	Implementation and Monitoring Plan
SMP	Seabird Monitoring Programme
SPA	Special Protection Area
SNCB	Statutory Nature Conservation Bodies

1. Wardening at the Dunbar Kittiwake Colony

1.1. Background

Wardening of kittiwake colonies on the mainland site of Dunbar Castle is proposed by the Applicant as one of a suite of compensatory measures. The wardening position is proposed as an umbrella role to implement a series of sub-measures to reduce human disturbance and improve nesting habitat for kittiwakes at Dunbar Castle, as explained in section 3.3 of the Colony Compensatory Measures (CCM) Evidence Report forming part of the Derogation Case.

There is reasonable evidence, based on the best scientific information available, that human disturbance impacts seabirds, including seabird productivity, as evidenced in section 3.3.2 (human disturbance) of the CCM Evidence Report. Specifically at Dunbar, there is reasonable evidence that disturbance is a significant factor at this colony. The objectives of the wardening role are to identify the site-specific limiting factors to the colony in order to implement solutions to improve both the number of birds nesting at Dunbar Castle and their breeding success. These objectives will be measured through a conservation target of approximately 400 pairs (800 birds) to bring the colony back to peak numbers recorded in 2000. The explanation and justification of this conservation target is provided within section 3.4 of the CCM Evidence Report submitted as part of the Derogation Case.

In their response to the Section 36. Application, MD-LOT stated *“in relation to the Dunbar colony measures, assessment has not quantified impacts from development to the non-SPA colony which has been identified by NatureScot and RSPB. MD-LOT seeks additional information quantifying impacts from the development to the Dunbar kittiwake population, and any available quantitative evidence on disturbance limiting population expansion. Should this information not be available, this should be outlined and justified.”*

Furthermore *“NatureScot has highlighted that UK Seabird Monitoring Programme (SMP) database includes breeding success data from multiple kittiwake monitoring plots in the general Dunbar area that could be used to investigate whether there is any compelling evidence for localised effects at particular sub-colonies in the Harbour area. MD-LOT advise that this is investigated and provided as additional information.”*

The Applicant’s response to this request for additional information is therefore split into two parts in this report:

- 1) Quantification of impacts on the Dunbar Castle kittiwake population; and
- 2) Quantitative evidence of disturbance including SMP productivity data.

1.2. Quantification of impacts on the Dunbar Castle kittiwake population.

Funding a warden for the Dunbar Castle kittiwake colony (a non-designated site) was recommended during stakeholder consultation to increase both the number of adults nesting at this colony and their breeding success. This measure would strengthen kittiwake populations within the Forth Islands and Farne Islands SPAs, as evidenced at paragraph 268 of the CCM Evidence Report.

At its peak in 2000, the Dunbar Castle kittiwake colony numbered just short of 1,200 pairs. Given that the colony previously supported >1,100 pairs during several years during the early 2000s (2006, 2007 and 2010), it is considered that bringing the colony back to this level from the 808 nests observed in 2020 would be a realistic conservation target. An overall increase of ~400 pairs (800 birds) works out at an additional 23 birds per year assuming a 35-year project lifespan (noting that recovery is unlikely to occur in this linear fashion as outlined in section 3.4 of the CCM Evidence Report).

Total predicted impacts to non-SPA seabird colonies from the Proposed Development were quantified in the Section 36 Application in Appendix 11.5 of the Offshore Environmental Impact Assessment (EIA) Report (Annex B, Table B.1). This was a required step in order to accurately apportion predicted impacts to Special Protection Area (SPA) colonies. Using the Marine Scotland Apportioning Tool (Butler et al. 2020), approximately 17.3% of predicted adult kittiwake mortality was apportioned to non-SPA colonies during the breeding season.

The non-SPA apportioning total includes a number of SMP subsites which the Applicant has subsequently disaggregated to determine that approximately 0.15% of predicted kittiwake mortalities were apportioned to the SMP subsite Dunbar Harbour (equivalent to Dunbar Castle) during the breeding season, and 0.0% during the non-breeding season.

The SMP subsite Dunbar Coast was attributed to the Firth of Forth SPA in the Section 36 Application following the Marine Scotland Apportioning Tool method (Butler et al. 2000), with approximately 1.16% of predicted kittiwake mortality apportioned to this designated site during the breeding season, and 0.10% during the non-breeding season (Offshore EIA Report, appendix 11.5, annex B). As such, predicted kittiwake mortality at the Dunbar Coast SMP subsite is accounted for in the total predicted impacts to SPA seabird colonies from the Proposed Development, as outlined in the Offshore EIA Report (appendix 11.5, annex B). The request for additional information in relation to predicted impacts on non-SPA colonies is therefore only relevant to the Dunbar Harbour SMP subsite (Dunbar Castle), with predicted kittiwake mortality for the Dunbar Coast SMP subsite provided in Table 1.1 for completeness.

Following the approach outlined in Part Three of the Report to Inform Appropriate Assessment (RIAA), predicted mortality estimates for the breeding period were apportioned to age classes on the basis of the plumage characteristics of kittiwakes recorded during the breeding period baseline surveys (Offshore EIA Report, volume 3, appendix 11.1). It was also assumed that 10% of the breeding adults in the population miss breeding in any given year (i.e. sabbatical birds) so that the number of estimated adult deaths during the breeding season was adjusted accordingly (G. Holland, email 26/01/2022). Mortality was estimated following the Scoping and Developer Approaches as outlined in the Offshore EIA Report (volume 3, appendix 11.4, annex G).

Based upon option 2 of the deterministic collision risk model, with a 98.9% avoidance rate applied, and in conjunction with the estimates and assumptions detailed above, the annual collision mortality of kittiwakes from the Dunbar Harbour SMP subsite (Dunbar Castle) is predicted to be 0.8 adults during the breeding season as determined by the Scoping Approach, and 0.6 adults as determined by the Developer Approach (Table 1.1). No collision mortality was predicted for the non-breeding season.

Potential breeding season displacement mortality of kittiwakes from the Dunbar Harbour SMP subsite (Dunbar Castle) is predicted to be 0.1 adults based on the lower rates advised under Scoping Approach A and 0.3 adults based on the higher rates advised under Scoping Approach B, with the Developer Approach predicting displacement mortality of 0.2 adults. No displacement mortality was predicted for the non-breeding season.

Therefore, total mortality for adult kittiwakes at the Dunbar Harbour SMP subsite (Dunbar Castle) is predicted to be between 0.7 and 1.1 per annum. The Applicant maintains that a conservation target of 23 adult birds per year over 35 years will deliver net benefits to affected SPA populations when set against total projected annual breeding season mortality of 0.7-1.1 adult kittiwakes at Dunbar Castle where measures are proposed.

Table 1.1. Apportioned kittiwake collision mortality to the SMP subsites Dunbar Harbour (Castle) and Dunbar Coast, as determined following the Scoping and Developer Approaches. The proportion of breeding and sabbatical adults are also presented (Part Three of the Report to Inform Appropriate Assessment). Estimates are for the Maximum Design Scenario and are based on Option 2 of the deterministic collision risk model using a 98.9% avoidance rate.

Colony	Season	Approach	Proportion Adults	Colony Weight	Proportion Sabbaticals	Estimated Collisions	
						Ads	Imms
Dunbar Harbour	Br	Scoping	0.97	0.0015	0.10	0.8	0.0
		Developer				0.6	0.0
	Non-br	Scoping	-	0.0000	-	0.0	0.0
		Developer				0.0	0.0
Dunbar Coast	Br	Scoping	0.97	0.0116	0.10	6.2	0.2
		Developer				4.3	0.1
	Non-br	Scoping	-	0.0010	-	0.4	0.4
		Developer				0.3	0.3

Table 1.2. Apportioned kittiwake displacement mortality to the SMP subsites Dunbar Harbour (Castle) and Dunbar Coast kittiwake colonies, as determined following the Scoping and Developer Approaches. The proportion of breeding and sabbatical adults are also presented (Part Three of the Report to Inform Appropriate Assessment).

Colony	Season	Approach	Proportion Adults	Colony Weight	Proportion Sabbaticals	Estimated Collisions	
						Ads	Imms
Dunbar Harbour	Br	Scoping A	0.97	0.0015	0.10	0.1	0.0
		Scoping B				0.3	0.0
		Developer				0.2	0.0
	Non-br	Scoping A	-	0.0000	-	0.0	0.0
		Scoping B				0.0	0.0
		Developer				-	-
Dunbar Coast	Br	Scoping A	0.97	0.0116	0.10	0.6	0.0
		Scoping B				1.9	0.1
		Developer				1.3	0.0
	Non-br	Scoping A	-	0.0010	-	0.0	0.0
		Scoping B				0.2	0.2
		Developer				-	-

1.3. Quantitative evidence of disturbance including Seabird Monitoring Programme (SMP) productivity data.

The case made for disturbance being an issue at Dunbar, is partly based on a paper by Searle et al. (2023), which examines breeding success across multiple kittiwake colonies in the Forth region in relation to the sandeel fisheries closure. This analysis found that the kittiwake colonies at Dunbar Coast and the Isle of May showed markedly differing changes in breeding success from the period of fishery operation to its subsequent closure, with breeding success at Dunbar Coast continuing to show a moderate decline, whilst breeding success on the Isle of May increased by around 17% over the same period. Searle et al. (2023)

suggested that colony disturbance may be one of a number of factors driving lower breeding success at Dunbar Coast.

The data used in the Searle et al. (2023) analyses are from the UK SMP database for the Dunbar Coast kittiwake productivity monitoring site, which extends from NT66747921 below Winterfield Golf Club, east to NT67857934 at the entrance to Dunbar Harbour (Figure 1.1). These data exclude productivity data collected separately by East Lothian Council Countryside Rangers at Dunbar Castle (sub-colony 4 “north harbour entrance” on Figure 1.2; T.Sykes 2023 *pers.comm.* 30 June).

Following initial email correspondence with the SMP Database Manager on 23/06/2023, a formal request was made by the Applicant on 26/06/2023 to the British Trust for Ornithology (BTO) via their online Data Request Form to determine if productivity data from Dunbar Coast could be extracted from the UK SMP database according to individual monitoring plots. However, the BTO responded to state that while they could confirm that kittiwake data were collected from the coast north of Dunbar itself, “*the only locational information that we have is the start point NT66747921 and end point NT67857934 of the route followed by the surveyors*” (BTO, email 17/07/2023). The BTO went on to state that they were hoping to obtain further information about count locations from the surveyors but that this would take some time to resolve. No further information has been made available within the timeframes available for submission of this report.

Figure 1.3 compares productivity data collected at across the Dunbar Coast monitoring site and the Dunbar Castle subcolony, in relation to productivity data from the Isle of May for context. This shows that productivity data collected at the Dunbar Castle subcolony align to the trend in productivity seen along Dunbar Coast. Both Dunbar colonies show lower productivity than the Isle of May from 2014 onwards (Figure 1.3), which supports the proposition from Searle et al that factors additional to prey availability may be affecting kittiwakes at Dunbar.

Based on the evidence provided in section 3.3.2 (human disturbance) of the CCM Evidence Report, it is reasonably considered by the Applicant that the decline may be due to increased human disturbance. Indeed, there is agreement among East Lothian Countryside Rangers and Dunbar Harbour Trust of anecdotal evidence showing that disturbance is an issue. Kittiwake abundance at different subcolonies within the Dunbar Castle colony are shown in Figure 1.4. In 1995, a large quantity of masonry from the main Castle fell into the sea (Figure 1.4). It seems likely that at this point a reasonable proportion of the kittiwakes breeding on the main Castle relocated to the inner Castle, which was fenced off at this point in time, and no longer accessible to people. The main Castle, the north Harbour entrance and the south Harbour remain accessible via footpaths and have shown sustained declines since the mid-1990s, in contrast to the inner Castle subcolony (Figure 1.4).

Disturbance to breeding seabirds has recently been reported by RSPB as a rapidly growing issue for a range of species (Lock et al. 2023). Gathering additional quantitative baseline evidence of sources of disturbance is considered a priority and would be secured through the Implementation and Monitoring Plan (IMP) for this measure.

1.4. Conclusions

Predicted kittiwake mortality at the SMP subsite Dunbar Coast was attributed to the Firth of Forth SPA in the Section 36 Application and is therefore accounted for in the total predicted impacts to SPA seabird colonies from the Proposed Development (as outlined in the Offshore EIA Report, appendix 11.5, annex B)

Total mortality for adult kittiwakes at the SMP subsite Dunbar Harbour (Dunbar Castle) is predicted to be between 0.7 and 1.1 per annum. Therefore, the Applicant maintains that a conservation target of 23 birds per year over the 35-year project lifespan will deliver net benefits to affected SPA populations.

Both Dunbar colonies show lower productivity than the Isle of May from 2012 onwards, which supports the proposition in Searle et al. (2023) that factors additional to prey availability may be affecting kittiwakes at Dunbar.

There is sufficient evidence to support a reasonable decision that the Dunbar Castle wardening would result in a reduction in disturbance and benefits to the affected populations given:

- The change in location of nesting at Dunbar Castle subcolonies in fenced versus unfenced areas;
- Agreement among East Lothian Council Countryside Rangers and Dunbar Harbour Trust of anecdotal evidence showing that disturbance is an issue; and
- Wider reporting that disturbance to breeding seabirds is a growing issue for a range of species including those breeding on cliffs (Lock et al. 2023).

Further studies are planned in advance of implementation in order to develop an Operational Kittiwake Management Plan as outlined in the IMP. This would include the collection of additional baseline data by the warden from one breeding season, with a focus on understanding three main objectives:

- 1) Kittiwake colony: baseline abundance and productivity data gathered to establish the current status and extent of the Dunbar Castle colony for the purposes of monitoring and management. This may also involve gathering data on nest attendance and chick provisioning. Data collection would be undertaken following standard protocols set out in the Seabird Monitoring Handbook (Walsh et al. 1995).
- 2) Sources of disturbance: to understand how various types of disturbance are impacting kittiwakes and how these can best be addressed, the IMP outlines that community engagement and baseline monitoring will be undertaken by the warden to record and identify sources of human disturbance. This would involve noting publicly accessible areas and proximity to nests, recreational use of the Castle, harbour and surrounding waters and vessel movements in the harbour.
- 3) Constraints to kittiwake habitat: to determine constraining factors associated with kittiwake habitat at Dunbar, abundance and productivity data will be gathered from subsites additional to those around Dunbar Castle e.g. the rocky outcrops, magazine and coastline (following Walsh et al. 1995).

It is intended that further detailed plans specific to each individual compensatory measure will be produced in consultation with key stakeholders for approval by Scottish Ministers. Further information is provided in sections 4 and 5 of the IMP, which is further supported by the Additional Environmental Information (AEI) submitted for the Derogation Case on implementation, monitoring and adaptive management.



Figure 1.1. The stretch of coastline classed as 'Firth of Forth SPA: Dunbar Coast' in the SMP database, from which productivity data is used in Searle et al. (2023).



The **RED numbers** show the number of nests in each area from 2020.
GREEN numbers show Kittiwake count areas:

1-main Castle,	4-North Harbour entrance,	7-Johnston's Hole 1,	10-sea wall,
2-Inner Castle,	5-Magazine,	8-Johnston's Hole 2,	11-Rock outcrop 2,
3-South Harbour entrance,	6-Leisure Pool	9-Rock outcrop 1	12-Johnston's Hole 3

Figure 1.2. Location of kittiwake nesting areas within Dunbar Castle and surrounding coastline including subcolony 4 (north harbour entrance circled in black) for which productivity data are collected by East Lothian Council Countryside Rangers (T.Sykes 2023., *pers.comm* 30 June).

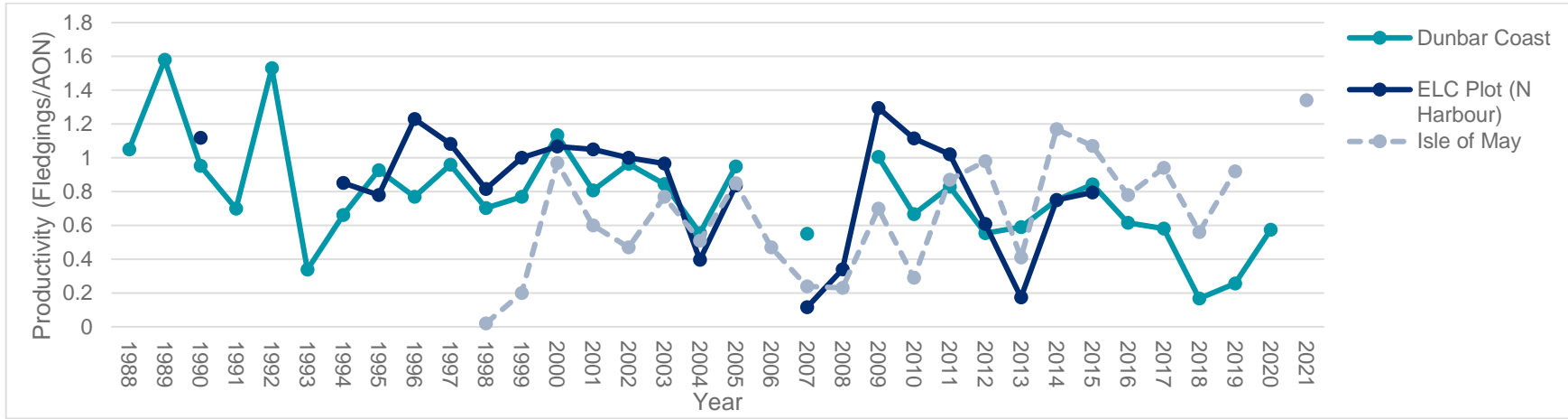


Figure 1.3. Kittiwake productivity data collected at the Isle of May, Dunbar Coast and the East Lothian Council (ELC) monitoring plot at Dunbar Castle.

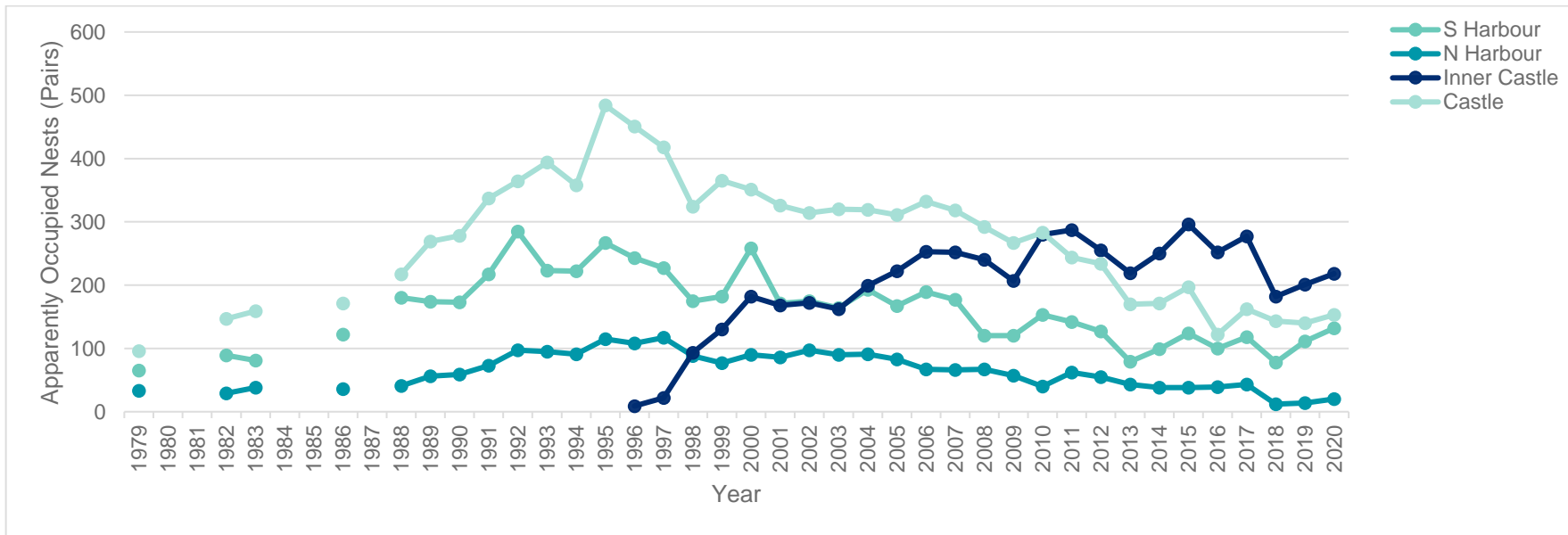


Figure 1.4. Kittiwake abundance data (AON) collected at Dunbar Castle subcolonies.

References

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