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Appendix D – Collision Risk Modelling Report (Gittings, 2026)

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1. COLLISSION RISK MODELLING REPORT (GITTINGS, 2026)

1.1 BACKGROUND

ACP required clarification of the exact population levels used in the collision risk assessment in the estimation of the potential increase in mortality by wind turbine collisions to the Lough Ree SPA Whooper Swan population. They noted that the "population reference level used for Lough Ree appears to incorporate a wider area" and requested an updated estimate of mortality thresholds for "the relevant species listed for Lough Ree as defined by the SPA population cited in the conservation objectives".

For this response, the collision risk assessment has been updated using the baseline and recent population estimates contained in the conservation objectives for Lough Ree SPA (NPWS 2025). Revised mortality thresholds and corresponding increases in annual mortality are presented below.

1.1.1 Population data

The collision risk assessment in the CRM report (Appendix 8-5 of the original EIAR) included two populations relevant to Qualifying Interests of the Lough Ree SPA: the Whooper Swan population at the county scale, which was defined as including Lough Ree and County Longford, and the Golden Plover population at the local scale, which was defined as Lough Ree.

1.1.1.1 Whooper Swan

The Whooper Swan populations covered by the collision risk assessment are listed in Table 2.5 of the CRM report and discussed in Section 2.7 of the report. Lough Ree was included as part of the regional population, which also included all other sites in County Longford. The data was obtained from the 2020 International Swan Census (ISC) and included a total of 195 birds from Lough Ree.

The conservation objectives for the Lough Ree SPA (NPWS 2025) define the baseline population for Lough Ree as 139 Whooper Swans. This is the three-year mean of peak counts for the winters of 1997/98–1999/2000. The objectives also define the recent population as 126 Whooper Swans. This is the four-year mean of peak counts from the winters of 2018/19–2020/21 and 2022/23 (there was no data for the winter of 2021/22). The 2019/20 peak was taken from the ISC data, while the peaks for the other winters were taken from Irish Wetland Bird Survey (I-WeBS) data.

The actual peak counts for the winters of 2018/19–2020/21 and 2022/23 were 73–122 for the three winters where they were derived from I-WeBS data and 195 for the winter derived from ISC data. The higher count in the latter winter may reflect more comprehensive species-specific survey coverage in the International Swan Census compared with standard I-WeBS counts. In this context, the 9% decline between 1997/98–1999/2000 and 2018/19–2022/23 referred to in the conservation objectives should be interpreted with caution because differences in survey methodology and coverage may account for some or all of the apparent change.

1.1.1.2 Golden Plover

The Lough Ree Golden Plover population is shown as 1,225 birds in Table 2.5 of the CRM report. This differs from the recent population figure of 927 birds in the conservation objectives. The reason for the discrepancy is the inclusion of an additional winter (2023/24) in the data used for the CRM report: i.e. the recent population in the conservation objectives is for the period 2018/19–2022/23, while the CRM population estimate is for the period 2018/19–2023/24[1]. Both estimates excluded the peak count for the winter of 2019/20, which was only 30 birds and clearly reflected coverage issues.

1.1.2 Updated mortality thresholds

The 1% mortality thresholds used in the collision risk assessment were derived from the population estimates multiplied by the estimates of the background mortality rates.

Updated 1% mortality thresholds are shown in Table 1.1 for all of the Lough Ree Qualifying Interest species included in the collision risk assessment. The conservation objectives define both a baseline population (used to assess long-term conservation status) and a recent population (reflecting current monitoring). Mortality thresholds are therefore shown for both population estimates.

1.1.3 Updated collision risk assessment for the Lough Ree SPA populations

The updated collision risk assessments for the baseline and recent Lough Ree population estimates from the conservation objectives are shown in Table 1.1 below. As with the mortality thresholds, the mortality increases are shown for both the baseline and recent population estimates.

Note that for any given values of collision risk and background mortality, the increases in annual mortality rates are a linear function of population size. So potential increases in annual mortality rates can be estimated from the data in Tables 2.5 and 5.1 of the CRM report (Appendix 8-5 of the original EIAR) for populations of any size (subject to a possible ± 0.1% error, due to rounding).

[1] The source details for the Golden Plover local population in the footnote to Table 2.5 in the CRM report should read: mean annual Irish Wetland Bird Survey peak counts, 2018/19, 2021/22, 2022/23 and 2023/24.

Table 1.1. Mortality thresholds and potential increases in annual mortality rates due to the predicted collision risk from the Derryadd Wind Farm to the Lough Ree SPA non-breeding Whooper Swan, Teal, Mallard, Golden Plover and Lapwing populations, based on the population estimates in the Lough Ree SPA conservation objectives.

Species	Period	1% threshold	Mortality increases with distance effects	
			uncorrected	corrected
Whooper Swan	baseline	0.3	0.6% (0.3%–1.3%)	1.1% (0.6%–2.2%)
	recent	0.3	0.7% (0.4%–1.4%)	1.2% (0.7%–2.4%)
Teal	baseline	6.9	0.0%	0.0%
	recent	1.5	0.2%	0.2%
Mallard	baseline	4.1	0.1% (0.0%–0.2%)	0.2% (0.1%–0.4%)
	recent	2.0	0.2% (0.1%–0.5%)	0.3% (0.1%–0.9%)
Golden Plover (avoidance = 99.6%)	baseline	8.3	0.3% (0.1%–1.1%)	0.8% (0.3%–3.2%)
	recent	2.5	0.9% (0.3%–3.6%)	2.7% (0.9%–10.6%)
Golden Plover (avoidance = 99.8%)	baseline	8.3	0.1% (0.0%–0.5%)	0.4% (0.1%–1.6%)
	recent	2.5	0.5% (0.1%–1.8%)	1.4% (0.4%–5.3%)
Lapwing	baseline	17.1	0.0% (0.0%–0.2%)	0.1% (0.0%–0.4%)
	recent	3.9	0.2% (0.0%–0.7%)	0.4% (0.1%–1.8%)

The increases in annual mortality rates are shown separately for collision risk estimates from models with distance effects uncorrected or corrected, with uncertainty ranges in parentheses (see CRM report for more details). Separate estimates of mortality increases are included for Golden Plover using avoidance rates of 99.6% and 99.8%.

1.1.4 Discussion

The standard caveats that apply to collision risk assessments should be considered. These include the precautionary assumptions that all the collision fatalities were adult birds, and that the collision mortality was additive rather than compensatory, and the fact that the 1% threshold is likely to be very precautionary. Therefore, substantial increases in annual mortality well above the 1% threshold are likely to be required to cause significant impacts on the affected populations.

1.1.4.1 Whooper Swan

The potential increases in annual mortality rates shown in Table 1.1 are based on the estimates of the Lough Ree SPA Whooper Swan population from the Lough Ree SPA conservation objectives. However, these estimates are based on daytime I-WeBS and ISC counts. If, as seems likely, birds are using Lough Ree as a nocturnal roost and commuting to surrounding bogland and fields to feed during the day, such counts will only record a partial component of the population using Lough Ree. In this context, it is notable that the ISC counts from sites within 5 km of the proposed wind farm site recorded more birds than those from Lough Ree (247 versus 195 birds) and almost twice the recent population estimate for Lough Ree.

Given its size and the estimated core foraging range for Whooper Swan of 5 km (SNH 2016), Lough Ree may host several discrete Whooper Swan populations of which only some are likely to interact with the proposed wind farm site. The analysis of Whooper Swan movement patterns for the 2019 planning application (Gittings 2019) indicated that a large component of the Whooper Swan flight and ground activity within the proposed wind farm site appeared to be

associated with a local population centred on a presumed night roost location along the Shannon to the north of the site and had little connectivity with the Lough Ree SPA. Therefore, allocating the entire predicted collision risk to the Lough Ree SPA population is likely to overestimate the impact on that population.

Accordingly, the potential increases in annual mortality rates shown in Table 1.1 should be regarded as precautionary estimates of impact on the Lough Ree SPA population.

1.1.4.2 Golden Plover

Wintering Golden Plover generally have larger winter home ranges than Whooper Swans, so there is more justification in using Lough Ree data to estimate the population likely to be at risk from the proposed development. However, as noted in the CRM report (Appendix 8-5), the local population was estimated from Irish Wetland Bird Survey data. As many Golden Plover occur away from wetland sites, the size of the local population used for the collision risk assessment may have been a significant underestimate. Also, the large change in the estimate caused by inclusion of data from an additional winter (see Section 1.1.1.2) indicates that there is considerable uncertainty around these estimates, reflecting the difficulties in accurately censusing this mobile and dispersed species.

The CRM report also noted that the correction for distance effects may have resulted in an overestimation of the Golden Plover collision risk. Most of the collision risk was generated by records of large flocks. It is likely that the under-detection of distant flightlines is much less of an issue for large flocks compared to small groups and individual birds. Therefore, the smaller collision risk generated by the uncorrected model may be more reliable in this case.

1.1.4.3 Other species

The degree of connectivity between the proposed wind farm site and Lough Ree for Mallard and Teal is not known. However, both these species are likely to have local wintering populations in the proposed wind farm site that are not dependent on Lough Ree. Consequently, applying the full predicted collision mortality to the Lough Ree SPA populations is likely to represent a precautionary assumption.

Lapwing is similar to Golden Plover in having wide-ranging and mobile wintering populations.

1.1.5 References

Gittings, T. (2019). Derryadd Wind Farm, Co. Longford: Whooper Swan Summary Report.

NPWS (2025). Conservation Objectives: Lough Ree SPA 004064. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

SNH. (2016). Assessing connectivity with Special Protection Areas (SPAs). Scottish Natural Heritage.



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