Rampion 2 Wind Farm

Category 8: Examination Documents

Great black-backed gull assessment sensitivity

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1. Introduction

1.1 Background

1.1.1 As presented Within Natural England's Relevant Representations [**RR-265**] the following query was raised in relation to the EIA cumulative collision risk assessment for great black-backed gull (*Larus marinus*):

"Natural England advises that there is evidence to suggest that the cumulative impact on great black-backed gull is moderate adverse at the EIA scale, and therefore the Applicant should carefully consider whether there are ways to mitigate this effect without negatively impacting on other receptors (e.g.seascape impacts)."

1.1.2 Noting the acknowledgement from Natural England that any further mitigation for great black-backed gulls needs to avoid negatively impacting on other receptors, the Applicant has considered the potential usage and behaviour of great black-backed gulls within the project area to aid in identification of any potential mitigation measures.

1.1.3 Additionally, the Applicant's approach to Collision Risk Modelling (CRM) to inform assessments presented within **Chapter 12: Offshore and Intertidal Ornithology, Volume 2** **[APP-053]** followed all of Natural England's recommended input parameters within their interim CRM guidance note (Natural England, 2023). The Applicant considers that some of the parameters recommended by Natural England can be considered highly precautionary, therefore potentially leading to an overly pessimistic level of impact predicted. In order to provide a greater range of the level of impact the project may pose, the Applicant has undertaken additional CRM using alternative input parameters to those recommended by Natural England to provide greater clarity on the overall level of risk the project may pose to great black-backed gulls.

2. Area usage of great black-backed gulls

2.1 Great Black-backed gull Demographics within the UK

2.1.1 Great black-backed gulls in Britain have seen a decline in recent years, with the highest level of decline observed in Scotland and the northern Isles (Burnell *et al*, 2023). Historic counts indicated high populations of the species, with birds taking advantage of waste treatment sites and fish discards to forage food, which is suggested as being a possible cause of the great black-backed gull population seeing significant expansion in the early 20th century (Burnell *et al*, 2023). With the change in industry standards for these two practices, the availability of easy food sources has reduced, and thus leading to the declines observed in the great black-backed gull populations within the UK, especially Scotland which holds nearly 50% of the entire UK population (Burnell *et al*, 2023). However, it has been suggested that rather than the great black-backed gull population being in decline, it is likely stabilising to 'normal' levels with the absence of the human mediated food source (Burnell *et al*, 2023). Although not at the same rate as other large gull species such as herring gull (*Larus argentatus*) and lesser black-backed gull (*Larus fuscus*), great black-backed gulls do appear to be shifting to nesting in urban environments which may aid in explanation of some declines seen in natural populations (Calladine *et al,* 2006; Burnell *et al*, 2023).

In contrast to the overall national trend, great black-backed gulls populations of Southern England and the Channel Islands have remained stable between the seabird 2000 and the latest seabird census (2015 – 2021) (Burnell *et al*, 2023), with only minor decreases or increases noted across counties. Therefore, the population for which Rampion 2 may interact with can be considered stable.

2.2 Area usage of great black-backed gulls within the Rampion 2 area

2.2.1 As detailed within **Figure 12-1-3-5** of **6.4.12.1 Appendix 12.1: Offshore and intertidal ornithology baseline technical report, Volume 4** **[APP-150]** several hotspots for great black-backed gull were noted within the aerial digital survey area during the breeding and non-breeding season. In order to further understand the usage of the Rampion 2 array area, digital aerial survey (DAS) imagery was re-examined to understand what may have been causing such hotspots.

2.2.2 The full methodology for the DAS conducted for Rampion 2 can be found in **Appendix 12.1: Offshore and intertidal ornithology baseline technical report, Volume 4**, **[APP-150]**. For the purpose of understanding great black-backed gull behaviour, all tagged images of great black-backed gulls were viewed to understand if the birds were in flight, sitting on the water, or perched on a structure.

2.2.3 DAS imagery of the Rampion 2 array area was examined and behaviours of great black-backed gulls identified. A total of 436 individual great black-backed gulls were tagged within the imagery, with 58 individuals shown as roosting on a wind turbine generator (WTG) situated within the operational Rampion 1 array area. Of the 58 great black-backed gull shown to be roosting, 66% were during the breeding season and the remaining 34% during the non-breeding season. Out of the 24 months surveyed, 14 months had great black-backed gulls that were using the structures to roost. Months that did not indicate any great black-backed gull usage of the WTG structures in either survey year include March, April and June, all other months had roosting behaviour in at least one year.

2.2.4 The great black-backed gulls identified as being perched were nearly always situated on the railings of the WTG platform. Herring gulls were also observed perching on WTG platforms, however this was only demonstrated in six of the 24 months surveyed with 46 herring gulls perched on WTG platforms in total. Lesser black-backed gulls were not observed roosting on a WTG platform across the whole survey period. It seems the vast majority of large gulls that utilise the WTG platforms are great black-backed gulls. An illustration of the usage of the WTG by great black-backed gulls can be seen in **Figure 2.1** to **Figure 2.3**.

Figure 2.1 Great black-backed gulls (red circles) perched on WTG in the non-breeding season (September 2020)

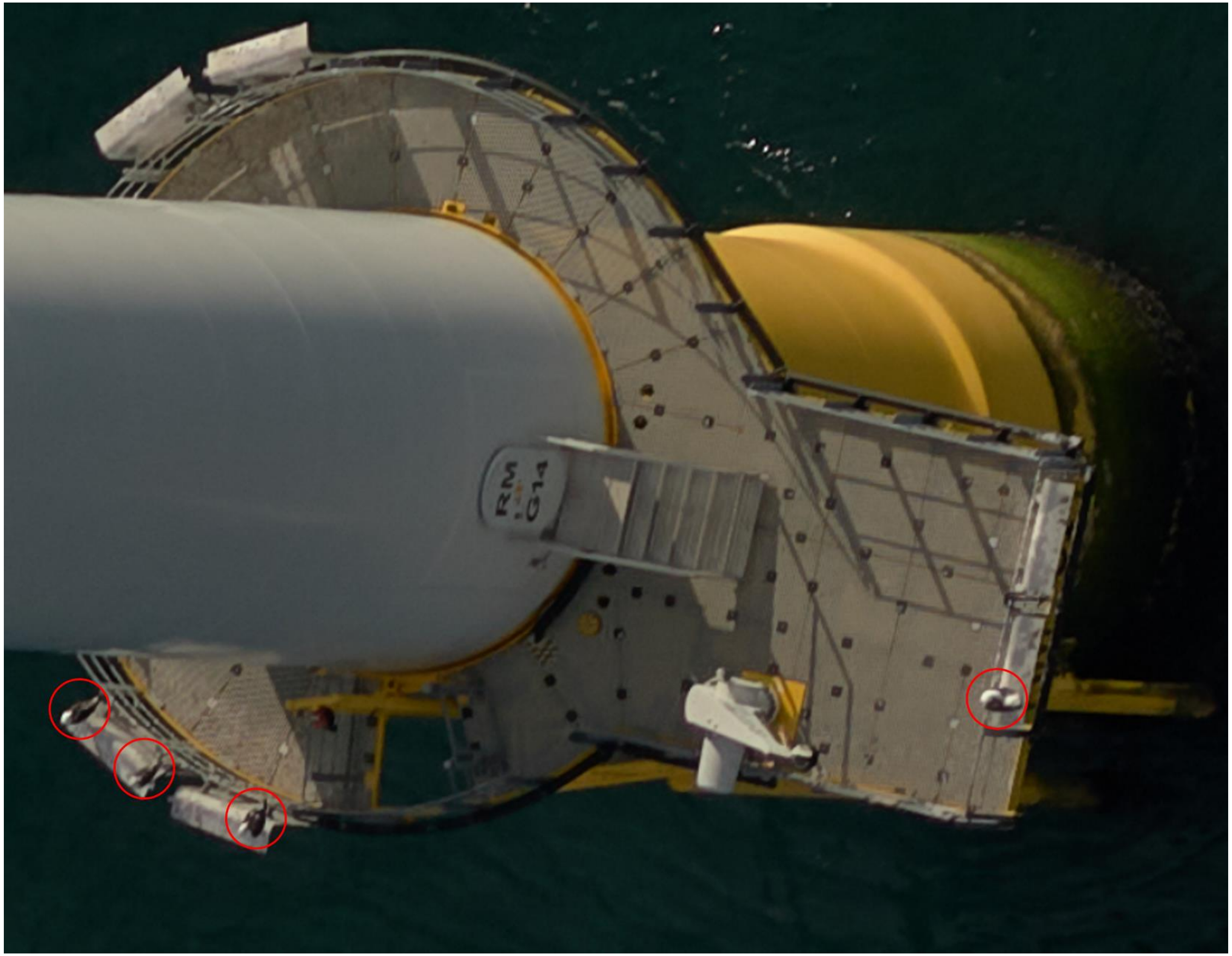


Figure 2.2 Great black-backed gulls (red circles) perched on WTG in the non-breeding season (December 2020)

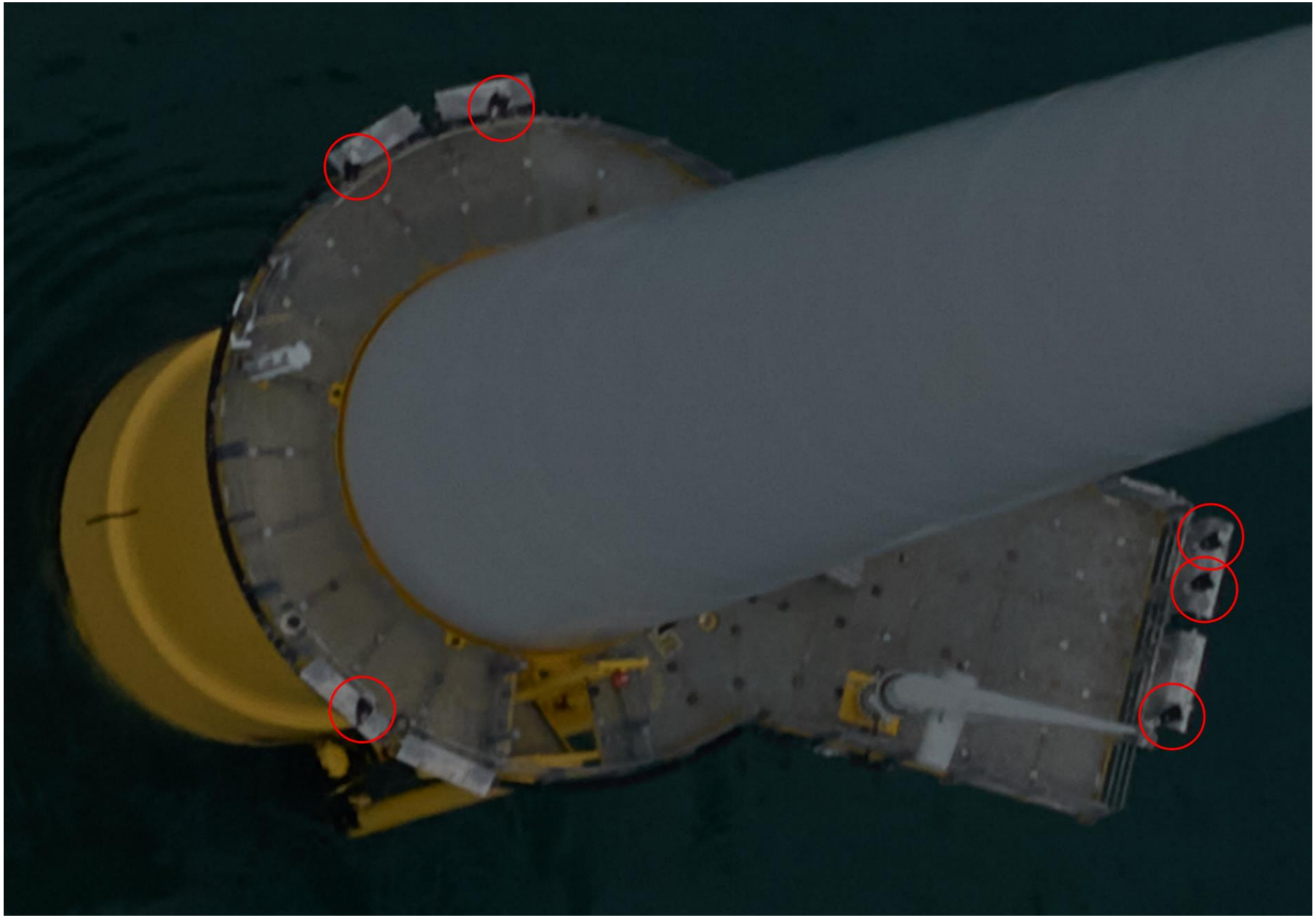


Figure 2.3 Great black-backed gulls (red circles) perched on WTG in the non-breeding season (February 2021)

2.2.5 As shown in **Figure 2.1** to **Figure 2.3** great black-backed gulls are seen roosting on the railings of the WTG platforms which suggests they have adapted to roosting in this newly available habitat. This was previously described by Dierscke *et al* (2016) where they suggest great black-backed gulls as having weak attraction to OWFs in European waters. Therefore, the utilisation of the Rampion 1 OWF by great black-backed gulls is not unexpected, especially considering the proximity to the coast. The weak attraction of the gulls to Rampion 1 OWF means there is possible inflation in the number of great black-backed gulls that would be naturally occurring in the Rampion 2 array area due to birds commuting to and from Rampion 1 roosting areas.

2.2.6 On review of the **Appendix 12.1: Offshore and intertidal ornithology baseline technical report, Volume 4** **[APP-150]** the hotspot in which great black-backed gulls are situated at Rampion 1 OWF is located at the edge of the array area. This would indicate that birds are not flying through the operational wind farm to roost but rather roosting on WTG platforms on the periphery. Great black-backed gulls have therefore adapted to the new roosting habitat, in the case of Rampion 1, likely flying low from the sea to the structure. It is likely that this unique same behaviour would be seen for Rampion 2 OWF, and therefore, the potential collisions for Rampion 2 would be at the lower range of the predicted impacts, incorporating a higher avoidance rate to account for meso / micro avoidance highly likely to be exhibited by these birds.

2.2.7 An increase in the number of birds in flight within the Rampion 2 array area due to the utilisation of Rampion 1 OWF will lead to more birds at potential risk of collision risk. Measures to deter great black-backed gulls from roosting in Rampion 1 OWF could be considered . Natural England (2019) suggest using gull spikes on areas where birds are seen to roost. In addition, barrier tape can be used to provide a ‘physical, visual and audible deterrent’. The implementation of these potential mitigation measures however needs to be weighed up against the effect of displacing the roosting birds. By adding the mitigation devices this might incur additional energetic cost to the great black-backed gulls roosting on the platforms as they will have to forage from the coast, rather than foraging from the WTG platforms, leading to increases in energetic demands. Therefore the implementation of such deterrents may not be an effective solution at minimising impacts on great black-backed gulls. The Applicant would welcome further discussion with Natural England on the findings within this report on great black-backed gull behaviour, combined with the range of impact results presented in **Section 3**.

3. Additional Collision Risk Modelling

3.1 Methodology

3.1.1 Previous CRM was conducted in accordance with Natural England's most recent guidance on collision risk modelling for marine birds, (Natural England, 2023), with the methodology and parameters modelled described in **Appendix 12.3: Offshore and intertidal ornithology collision risk modelling Volume 4** **[APP-152].** The parameters recommended by Natural England potentially include a high level of precaution and so by using all of Natural England's recommended parameters, multiple layers of precaution may have been built into the model providing significant uncertainty as to the realism of the level of effect from collision risk on great black-backed gulls (and other seabirds).

3.1.2 The original developer of the Band (2012) CRM specifically states they 'do not recommend worse case assumptions at each stage as this provides overly pessimistic results'. They in-turn recommend the use of 'best estimate' values when conducting CRM.

3.1.3 The Applicant has undertaken a re-modelling of collision risk impacts from the Project based on the use of alternative biometric parameters. Models were run using the parameters described in **Appendix 12.3: Offshore and intertidal ornithology collision risk modelling, Volume 4** **[APP-152]**, however, for these additional modelling scenarios one parameter per model run was changed in order to provide an indication of the difference between the outputs and the level of precaution built into the Natural England guidance. A comparison of the values to be modelled are in **Table 3.1**, with detail on the evidence bases for the alternate biometrics provided below. All CRM input parameters and monthly outputs are provided in **Appendix A**.

Avoidance rates

3.1.4 Natural England recommend the use of the large gull generic avoidance rate of 0.994 when modelling great black-backed gull collision impacts (Oszanlev-Harris *et al*, 2023). When appraising the data provided in Appendix 2 of the Oszanlev-Harris *et al* (2023) report, there are large differences between various parameters considered when comparing the various large gull species which contribute to the generic avoidance rate. The average great black-backed gull observed passage was 110.4 compared to 2,979.4 and 1,675.7 for lesser black-backed gull and herring gull, respectively. The passage rate of birds per hour was also lower in great black-backed gulls compared to lesser black-backed and herring gulls with values of 3.5, 19.5 and 23.9, respectively. Similarly, the flux of birds within the sweep zone was lower for great black-backed gulls, with a value of 1,212 compared to 4,615 for lesser black-backed gulls and 6,244 for herring gull. The three large gull species are clearly demonstrating different behaviours towards OWFs, with great black-backed gulls showing higher avoidance when considering the aforementioned parameter values. Therefore, the Applicant deems the use of a species-specific avoidance rate compared to a generic large gull avoidance rate is deemed more appropriate for CRM of great black-backed gull.

Flight speed

3.1.5 It is highly likely that the speed at which a bird flies is highly dependent on both wind speed and the type of flight behaviour exhibited, for example a seabird's flight speed when commuting or during migratory flights are likely to differ from when a species is actively foraging. Within the original Band (2012) CRM model and the Marine Scotland sCRM (Donovan, 2018) an increase in flight speed leads to a greater flux of birds predicted to pass through the OWF, thus increasing collision risk. Within the guidance document for the Band (2012) CRM, one area of uncertainty identified related to species biometrics, including flight speed due to the parameters not being a single fixed value. The author stated within the guidance (Band, 2012) that uncertainty relating to species biometrics and flight speed could affect the predicted impact by up to ±20%.

3.1.6 The flight speeds advocated by Natural England are derived from Alerstam *et al* (2007), which used radar tracking to calculate flight speeds of species with no association to an OWF. The flight speed value calculated for great black-backed gull was derived from a total of only four tracked flights. A more recent study on bird flight speeds within an operational OWF has been undertaken (Skov et al. 2018). This study used laser rangefinder tracking data to estimate flight speed both inside and outside the Thanet OWF from 284 tracks over a period of approximately two years. The Applicant's use of Skov et al., (2018) data is consistent with other recent collision risk assessments for UK OWFs (The Crown Estate, 2022) and, therefore, the Applicant considers such estimates on great black-backed gull flight speed to be more accurate and more representative of flight behaviour around OWFs and their WTGs in comparison to Alerstam *et al* (2007) highly limited dataset. The results of this study recorded slower flight speeds than currently advocated for collision risk modelling.

Nocturnal Activity Factor

3.1.7 The nocturnal activity factors currently advocated by Natural England are derived from the scoring index for nocturnal activity presented in Garthe and Hüppop (2004) based on literature review and personal observations. These index values were then converted into a nocturnal activity factor as follows; 1 = 0%, 2 = 25%, 3 = 50%, 4 = 75%, 5 = 100%. The report states that NAF values 'could not be quanitified by real data and was thus classified subjectively' (Garthe and Hüppop , 2004).

3.1.8 More recent studies of nocturnal activity (MacArthur Green, APEM & Royal HaskoningDHV 2015) have found significantly lower nocturnal activity than those presented in Garthe and Hüppop (2004), especially during the breeding season. A review of evidence in support of nocturnal activity rates for seabirds was undertaken for the East Anglia Three OWF (MacArthur Green, APEM & Royal HaskoningDHV 2015). This reviewed nocturnal activity based on the deployment of tracking loggers in both the breeding and non-breeding season, which provided evidence that activity levels recorded were significantly lower than currently advocated. Support for the use of a maximum 25% NAF for great black-backed gulls can be seen with the recent review of parameters used to calculate avoidance rates (Oszanlev-Harris *et al,* 2023), whereby a value of 25% is deemed as precautionary for large gull species.

3.1.9 Additionally Nocturnal Activity was recorded as part of the post consent monitoring undertaken at Thanet OWF (Skov et al., 2018), due to difficulty in accurately identifying birds at night to species level a generic seabird NAF of 3% was recorded.

Table 3.1 Comparison of previous and updated CRM parameters

Parameter	Value used in current and previous CRM		Difference in parameters
	Previous CRM (SD)	CRM re-assessment (SD)	
Avoidance rate	0.994 (0.0004)	0.9991 (0.0002)	Higher avoidance rate in updated CRM
Flight speed (m/s)	13.7 (1.2)	9.78 (3.65)	Slower flight speed in updated CRM
NAF	0.375 (0.0675)	0.25	Lower nocturnal activity factor in updated CRM

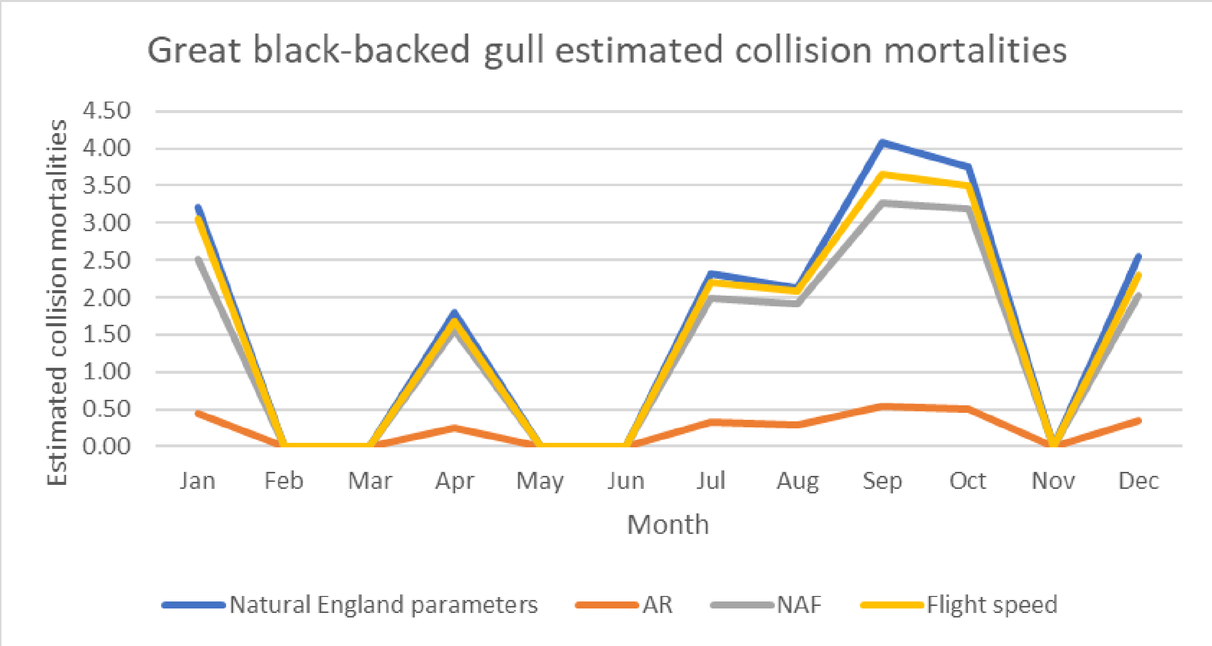
3.2 Results

3.2.1 This section provides a summary of the CRM following the introduction of the alternative input parameters. Results are provided as annual totals as well as being split into seasons (**Table 3.2**). A monthly comparison of models using different parameters is illustrated in **Figure 3.1**.

Table 3.2 Predicted seasonal and annual collision mortality for great black-backed gull using an updated avoidance rate

Season	Month	Predicted annual collisions				Percentage change from predicted collision using Natural England recommended values only		
		Natural England recommended values	Alternative avoidance rate	Alternative flight speed	Alternative NAF	Alternative avoidance rate	Alternative flight speed	Alternative NAF
Breeding	April – August	6.25	0.86	5.96	5.46	-86.2%	-4.6%	-12.6%
Non-breeding	September - March	13.59	1.85	12.51	11.00	-86.4%	-8.0%	-19.1%
Annual total		19.84	2.71	18.47	16.46	-86.3%	-6.9%	-16.8%

Figure 3.1 Predicted monthly collision mortality for great black-backed gull using alternative input parameters compared to Natural England recommended parameters



3.3 Conclusions

3.3.1 Overall, the predicted collisions for great black-backed gull were lower when modelled using any of the alternative parameters in comparison to the recommended parameters in the Natural England guidance. An overview of the differences between the CRM outputs using the Natural England recommended parameters and the alternative parameters is as follows:

- When using the alternative avoidance rate, the predicted annual collision for great black-backed gull reduced by 86.3% in comparison to using the Natural England recommended parameters.
- When using the alternative flight speed value, the predicted annual collision for great black-backed gull reduced by 6.9% in comparison to using the Natural England recommended parameters.
- When using the alternative NAF, the predicted annual collision for great black-backed gull reduced by 16.8% in comparison to using the Natural England recommended parameters.

3.3.2 There is clear variability in the predicted impacts from collision on great black-backed gulls and so it is important to consider the expected behaviour of birds specifically within Rampion 2, when drawing conclusions on the level of potential risk posed by the project. Great black-backed gulls have altered their behaviour to utilise the WTG platforms on the periphery of the Rampion 1 array in order to roost, therefore flying low and avoiding the centre of the array. This behaviour is likely to bring the potential impact towards the lower end of the collision risk range presented within **Table 3.2**, with a heightened avoidance.

3.3.3 Mitigation measures could be considered as noted within **Section 2.2**, with regard to the project in order to reduce the number of great black-backed gulls within the area, however the effectiveness of such deterrents may not be an effective solution at minimising impacts on great black-backed gulls due to additional energetic costs of foraging from land.

3.3.4 Taking into consideration the findings from the assessment sensitivity of CRM and the adapted behaviour of great black-backed gulls for the specific Rampion 1 scenario, it is likely that the potential impact from collision is at the lower end of the range presented within **Table 3.2**. Incorporating this lower predicted impacted for Rampion 2 into the cumulative assessment would significantly reduce the Project's contribution to any cumulative assessment value and therefore, the outcome from the Applicant remains of the position that there is no significant adverse effect for the project alone or cumulatively with respect to great black-backed gulls.

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Appendix A
CRM input parameters and monthly outputs

Rampion 2 turbine parameters

Input Parameter (units in brackets)	Mean Estimate
Turbine Model	Small
Number of Turbines	90
No. of Blades	3
Rotor Radius (m)	125
Air Gap (m) (HAT)	21.30
Max. Blade Width (m)	9
Tidal Offset (m) in sCRM (MSS, 2018)	4
Wind Farm Width (km)	32.9
Latitude (degrees)	50.632
Rotation speed (rpm)	5
Large Array Correction	Yes
Pitch (o)	0.1

Great black-backed gull CRM input parameters

Scenario	NAF	Avoidance rate	Flight height	Flight speed	Density data
Natural England recommended parameters	0.375 ± 0.0637	0.994 ± 0.0004	Johnston *et al*. (2014) Max Likelihood	13.7 ± 1.2	Mean density
Applicant's avoidance rate (Oszanlev-Harris *et al,* 2023)	0.375 ± 0.0637	0.9991 ± 0.0002	Johnston *et al*. (2014) Max Likelihood	13.7 ± 1.2	Mean density
Applicant's NAF (MacArthur Green, APEM & Royal HaskoningDHV, 2015)	0.250	0.994 ± 0.0004	Johnston *et al*. (2014) Max Likelihood	13.7 ± 1.2	Mean density
Applicant's flight speed (Skov *et al,* 2018)	0.375 ± 0.0637	0.994 ± 0.0004	Johnston *et al*. (2014) Max Likelihood	9.78 ± 3.65	Mean density

Great black-backed gull densities

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Density	0.081	0.000	0.000	0.028	0.000	0.000	0.031	0.031	0.063	0.063	0.000	0.053
SD	0.066	0.000	0.000	0.041	0.000	0.000	0.047	0.047	0.094	0.094	0.000	0.066

Monthly CRM outputs for assessment sensitivity scenarios

Month	Natural England recommended parameters	Applicant's AR	Applicant's NAF	Applicants flight speed
January	3.20	0.451	2.508	3.059
February	0.00	0	0	0
March	0.00	0	0	0
April	1.80	0.246	1.563	1.677
May	0.00	0	0	0
June	0.00	0	0	0
July	2.32	0.325	1.992	2.194
August	2.13	0.293	1.908	2.084
September	4.09	0.535	3.277	3.649
October	3.74	0.507	3.183	3.507
November	0.00	0	0	0
December	2.55	0.355	2.028	2.298
Total	**19.84**	**2.71**	**16.46**	**18.47**