



Awel y Môr Offshore Wind Farm

Clarification Note on Predicted Impacts Apportioned to Isle of Man Designated Sites

Marine Licence Submission 1

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Contents

1	Introduction.....	4
2	Impacts Apportioned to Isle of Man Ornithological Features.....	13
2.1	Consideration of the Isle of Man Marine Nature Reserves (MNR)	13
2.2	Impacts Apportioned to Isle of Man Marine Nature Reserves.....	26
2.2.1	Disturbance and displacement	26
	Manx shearwater	27
	Puffin	30
2.2.2	Collision risk	33
	Kittiwake	35
3	Consideration of Isle of Man Ramsar Sites	37
4	Consideration of Isle of Man ASSI Sites	39
5	References	41

Tables

Table 1: Isle of Man protected areas and distances to the AyM array area. ...	5
Table 2: Isle of Man protected sites, ornithological features and screening information.....	14
Table 3: Summary of predicted disturbance and displacement consequential mortality apportioned to the Manx shearwater feature of Calf and West Bank MNR.	29
Table 4: Summary of predicted disturbance and displacement consequential mortality apportioned to the puffin feature of all IoM MNRs assessed.....	31
Table 5: Summary of predicted collision mortality values apportioned to the kittiwake feature of all IoM MNRs assessed.	36

1 Introduction

- 1 This clarification note has been produced by the Applicant in response to the comments received from the Isle of Man (IoM) Government in its responses to the Awel y Môr (AyM) application for a Development Consent Order (DCO) and also the AyM Marine Licence application (ML-IoM) in relation to ornithological matters. The detailed responses received from IoM Government relating to ornithology were included within its submission to Natural Resources Wales (NRW) in relation to the Marine Licence application and are in Table 1. Within Table 1, the Applicant has signposted to where further consideration / clarity has been provided within this clarification note in relation to the comments raised.

Table 1: Isle of Man protected areas and distances to the AyM array area.

RESPONSE ID	MARINE LICENCE CONSULTEE RESPONSE	APPLICANT'S RESPONSE
ML-IoM-18	<p>Offshore Ornithology</p> <p>Given the proposed constructions, expected heights and operational duration outlined in the Marine Licence application summary, the TSC believes that wide-ranging seabirds, with links to the Isle of Man are a relevant consideration.</p>	<p>Details of where IoM ornithological features have been considered within assessments of AyM is provided within this clarification note.</p>
ML-IoM-19	<p>The TSC acknowledges that offshore ornithology has been screened in within the transboundary screening report, which is welcomed; as has been the consultation that we have received in relation to this proposal. The report states that the effects are given within each topic chapter of the Environmental Statement. The consideration of Manx conservation features, however, has been inconsistent across the chapters of the Environmental Statement and this is something that the Territorial Sea Committee will raise again in this response.</p>	<p>This note has been drafted to provide greater clarity to the IoM Government with respect to potential impacts from AyM when apportioned to birds from IoM's designated sites in relation to offshore ornithology.</p>
ML-IoM-20	<p>The Isle of Man view on the ornithology scoping has been included, in full, within the revised Scoping Report, but the applicant's responses are not stated, as they are for the UK</p>	<p>Further detail with respect to flight heights and Manx shearwater is provided in Section 2.2.2.</p>

RESPONSE ID	MARINE LICENCE CONSULTEE RESPONSE	APPLICANT'S RESPONSE
	consultations. We have therefore sought relevant evidence of consideration within the various reports. We have previously noted the lack of reference to Manx sites that are likely to relate to this study area, and specifically to the Manx shearwater and the comments of the JNCC relating to remaining flight height risks and the possible need for CRM assessment. The TSC has requested evidence of the specific consideration of the Isle of Man in such respects.	
ML-IoM-21	We note that no 'significant effects' were found in the ornithological assessments, and therefore site attribution was not undertaken. Nevertheless, although site-related considerations have arisen in the process, we have not found any reference to Manx seabird colonies or Manx sources of migrant birds, lying within the range of the Isle of Man, where they are a feature of a number of designated sites (ASSI, MNR and sites protected under the Manx Museum and National Trust Act), nor the Ballaugh Curraghs Ramsar Site. Notably, the Isle of Man wind farm proposal has been included within the cumulative effects consideration.	Further detail is provided below with respect to IoM ASSI, MNR and the Ballaugh Curragh Ramsar site, in relation to offshore ornithological features.

RESPONSE ID	MARINE LICENCE CONSULTEE RESPONSE	APPLICANT'S RESPONSE
ML-loM-22	In the Offshore Ornithology assessment (4.12.10) the effects on linked sites are covered, noting sites not taken into consideration within the Habitats Regulations Assessment (HRA). The Isle of Man does not designate sites under the EU Habitats Regulations (which do not apply to the Island) but we have not found evidence that Manx sites of a similar level of designation or relevance have been taken into account and treated in the same manner, under either of these considerations, nor separately under the transboundary consideration. Only Welsh sites were picked up as linked ornithological sites outside of the HRA.	Although not presented within the Report to Inform Appropriate Assessment (RIAA), potential impacts were apportioned accordingly to loM MNR, the details of which are provided in Section 2.2.
ML-loM-23	Similarly, within 'Annex 3, HRA European Site Information'; The Copeland Islands (UK) SPA is designated for the following qualifying features: Manx shearwater (<i>Puffinus puffinus</i>); Arctic Tern (<i>Sterna paradisaea</i>). Both species are also designation features of several Manx Marine Nature Reserves (Ramsey Bay, Calf of Man and Wart Bank, West Coast MNRs), which are closer and therefore more	With respect to the Manx Shearwater feature of loM MNRs, apportioned predicted impacts from AyM are presented in Section 2.2.1. With respect to Arctic tern, the predicted impacts from AyM apportioned to the loM's

RESPONSE ID	MARINE LICENCE CONSULTEE RESPONSE	APPLICANT'S RESPONSE
	<p>relevant for consideration within the scope of the proposed development and the ornithology chapter.</p> <p>In terms of seabird designation features, Rathlin Island SPA is very similar to the Calf of Man and Wart Bank MNR and the Baie ny Carrickey MNR, however the latter two are not acknowledged or considered, and are significantly closer.</p> <p>Similarly, within 'Annex 3 HRA European Site Information', the Burry Inlet and Severn Estuary Ramsar Sites are listed, but not the Isle of Man Ramsar Site at Ballaugh Curraghs or potential Ramsar Sites identified in a published report.</p>	<p>designated sites are presented in Section 4.</p> <p>With respect to the hen harrier feature of Ballaugh Curragh Ramsar, apportioned predicted impacts from AyM are presented in Section 3.</p>
ML-IoM-24	<p>It is good to see an assessment of the risk to migrants via migratory pathways analysis, but we did not see evidence that the Isle of Man has been included within the data utilised. Hen harrier was screened out following an assessment using Migropath. This utilised SPA features data and we do not think that Manx data may have been included in the consideration despite the presence of a high density of breeding hen harriers (<i>Circus cyaneus</i>) on the Isle of Man, some of which will cross the Irish Sea on migratory movements and dispersal, and form a likely source of this species passing southwards.</p>	<p>The Applicant presents an assessment of migratory hen harrier in Section 4.</p>

RESPONSE ID	MARINE LICENCE CONSULTEE RESPONSE	APPLICANT'S RESPONSE
ML-loM-25	<p>In relation in CRM for migrant birds, little tern migration is discussed, and note is made that migration tends to follow within 10 km of the coast, and that Irish birds must pass through British waters, but no mention is made of Manx breeding little terns which must cross the Irish Sea (along with the Arctic terns which also breed on the Isle of Man). There is, in fact, no mention of the loM in the Migration (Migropath) report.</p> <p>'Due to the migratory routes of terns described in Section 6.1, the population estimates with potential for connectivity with AyM on migration were identified as the Northern England and Scotland SPA populations located to the north of AyM and as a precautionary measure the total UK western non-SPA colonies, with population estimates derived from Appendix A of Furness (2015). Any Irish colonies or southern England SPA colonies were not included within the population estimates presented in Table 3, due to no connectivity identified based on their migration routes.' Page 18.</p>	The Applicant presents an assessment of migratory Arctic tern and little tern in Section 4.
ML-loM-26	We note the comments from the JNCC regarding the Rhiannon site data and the flight heights of Manx shearwaters, some of which fell within the expected rotor area for this development	The Applicant presents a collision risk assessment and selection of species considered in Section 2.2.2.

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	<p>(see ES Volume 4, Annex 4.5: Offshore Ornithology Scoping and Consultation Responses, page 16). With reference to 4.12.14 paragraph 313, we ask on what basis Manx shearwater was scoped out of the collision risk modelling (CRM)? Our interest in this is in the protection of a recovering colony of Manx shearwaters on the Calf of Man, and that these birds are a designation feature for the Calf and Wart Bank MNR, and the West Coast MNR. The study area is within the range of the birds nesting on the Calf of Man and there is a likely connection (suggested by directional data - see previous consultation response (attached)).</p>	
ML-loM-27	<p>In the offshore ornithology sections, despite the presence of relevant species of seabird on the Isle of Man, including regionally-relevant, breeding colonies and recovery programmes, there are;</p> <p>Only three, non-specific references to Isle of Man in the main chapter</p> <p>Volume 2, Chapter 4: Offshore Ornithology (April 2022, Revision: B) And no reference to Isle of Man in the following reports;</p>	<p>This note has been drafted to provide greater clarity to the loM Government with respect to impacts from AyM apportioned to loM's designated sites in relation to offshore ornithology.</p>

RESPONSE ID	MARINE LICENCE CONSULTEE RESPONSE	APPLICANT'S RESPONSE
	<p>Volume 4, Annex 4.1: Offshore Ornithology Baseline Characterisation Report (April 2022, Revision: B), though kittiwake (<i>Rissa tridactyla</i>) and Manx shearwater show flight directions which may connect breeding season movements with the Isle of Man</p> <p>Volume 4, Annex 4.5: Offshore Ornithology Scoping and Consultation Responses.</p>	
ML-IoM-28	<p>With no references, or acknowledgement of the Manx Marine Nature Reserves (which include significant seabird populations as designation features), the Calf of Man Bird Observatory (and its Manx Shearwater recovery programme), the Manx Ramsar site (Ballaugh Curragh) or key sea birds colonies, including ASSIs, it is difficult to confirm, or assume, that adequate consideration of Manx ornithological interests have been made. The Isle of Man Government has a reasonable expectation of demonstrable consideration within the Environmental Statement of issues relevant to the Isle of Man, but this is not yet apparent within the ornithological assessments.</p>	

RESPONSE ID	MARINE LICENCE CONSULTEE RESPONSE	APPLICANT'S RESPONSE
ML-IoM-29	By contrast, the Manx MNRs have, following consultation, now been adequately acknowledged and apparently considered in respect of marine mammals and, as such, the two approaches by consultants appear inconsistent.	This is noted by the Applicant.
ML-IoM-30	<p>In respect of the application for a Marine Licence;</p> <p>The Committee therefore requests evidence of specific consideration of the Isle of Man in relation to offshore ornithology in relation to the species and points outlined above.</p> <p>Further, it is recommended that the Licence regulators or developers contact relevant on-island organisations in relation to specific consideration of local ornithological interests; Manx Birdlife, Manx National Heritage, Manx Wildlife Trust.</p>	This is noted by the Applicant. If further clarification is required after reviewing this note the Applicant will facilitate further consultation.

2 Impacts Apportioned to Isle of Man Ornithological Features

2.1 Consideration of the Isle of Man Marine Nature Reserves (MNR)

- 2 With respect to consideration of the IoM Marine Nature Reserves (MNR) within ornithology assessments for AyM, Table 1 provides a summary of all IoM MNRs where connectivity was concluded. Additional justification is provided in the instance of where no connectivity was concluded. Where connectivity was concluded, Section 2.2 provides the predicted impacts apportioned to each IoM MNR and an assessment of the subsequent change in the population mortality rate relative to the baseline mortality rate that may result from such potential impacts.

Table 2: Isle of Man protected sites, ornithological features and screening information.

SITE NAME	DISTANCE TO AYM (KM)	DESIGNATION	POTENTIAL FOR CONNECTIVITY WITH AYM
Ramsey Bay MNR	103.0	Kittiwake (<i>Rissa tridactyla</i>)	Yes
		Puffin (<i>Fratercula arctica</i>)	Yes
		Guillemot (<i>Uria aalge</i>)	No – Ramsey Bay MNR is outside of the mean-max foraging range from AyM of 73.2 km (Woodward et al. 2019) for guillemot. Therefore, it can be concluded that there is no connectivity to AyM during the breeding season with respect to the guillemots associated with Ramsey Bay MNR. Outside of the breeding season connectivity is limited due to wider mixing of guillemots with other Western Waters BDMPS populations (Western Waters BDMPS population equates to 1,139,220 individuals in the non-breeding season as defined in Furness 2015), any effect which could be apportioned to guillemots from Ramsey Bay MNR would almost certainly be immaterial.

SITE NAME	DISTANCE TO AYM (KM)	DESIGNATION	POTENTIAL FOR CONNECTIVITY WITH AYM
		Razorbill (<i>Alca torda</i>)	No – Ramsey Bay MNR is outside of the mean-max foraging range from AyM of 88.7 km (Woodward et al. 2019) for razorbill. Therefore, it can be concluded that there is no connectivity to AyM during the breeding season with respect to the razorbill associated with Ramsey Bay MNR. Outside of the breeding season connectivity is limited due to wider mixing of razorbills with other Western Waters BDMPs populations (Western Waters BDMPs population equates to 341,422 individuals in the non-breeding season as defined in Furness 2015), any effect which could be apportioned to razorbill from Ramsey Bay MNR would almost certainly be immaterial.
Laxey Bay MNR	93.3	No ornithological features identified.	
Douglas Bay MNR	89.9	Cormorant (<i>Phalacrocorax carbo</i>)	No – Douglas Bay MNR is outside of the mean-max foraging range from AyM of 25.6 km (Woodward et al. 2019) for cormorant.

SITE NAME	DISTANCE TO AYM (KM)	DESIGNATION	POTENTIAL FOR CONNECITVTY WITH AYM
			Therefore, it can be concluded that there is no connectivity to AyM during the breeding season with respect to the cormorant associated with Douglas Bay MNR. Outside of the breeding season connectivity is limited due to wider mixing of cormorants with other Western Waters BDMPS populations (West of Scotland BDMPS population equates to 7,049 individuals and SW England and Wales BDMPS population equates to 9,602 in the non-breeding season as defined in Furness 2015), any effect which could be apportioned to cormorant from Douglas Bay MNR would almost certainly be immaterial.
		Shag (<i>Gulosus aristotelis</i>)	No – Douglas Bay MNR is outside of the mean-max foraging range from AyM of 13.2 km (Woodward et al. 2019) for shag. Therefore, it can be concluded that there is no connectivity to AyM during the breeding season with respect to the shag associated

SITE NAME	DISTANCE TO AYM (KM)	DESIGNATION	POTENTIAL FOR CONNECITVTY WITH AYM
			with Douglas Bay MNR. Outside of the breeding season connectivity is limited due to wider mixing of shags with other Western Waters BDMPs populations (West of Scotland BDMPs population equates to 37,363 individuals and SW England and Wales BDMPs population equates to 13,075 in the non-breeding season as defined in Furness 2015), any effect which could be apportioned to shag from Douglas Bay MNR would almost certainly be immaterial.
Little Ness MNR	87.6	Fulmar (<i>Fulmarus glacialis</i>)	No – as detailed in Table 14 of Volume 2, Chapter 4: Offshore Ornithology, fulmar is not considered sensitive to any potential impacts from OWFs and therefore no potential for a likely significant effect.
		Black guillemot (<i>Cepphus grylle</i>)	No – Little Ness MNR is outside of the mean-max foraging range from AyM of 4.8 km (Woodward et al. 2019) for black guillemot. Therefore, it can be concluded that there is

SITE NAME	DISTANCE TO AYM (KM)	DESIGNATION	POTENTIAL FOR CONNECTIVITY WITH AYM
			no connectivity to AyM during the breeding season with respect to the black guillemot associated with Little Ness MNR. Black guillemot was not recorded in the aerial digital surveys of AyM and a 4 km buffer during the non-breeding season therefore there is no connectivity of this species to AyM in the non-breeding season.
Langness MNR	85.0	No ornithological features identified.	
Baie ny Carrickey MNR	93.2	Kittiwake	Yes
		Puffin	Yes
		Guillemot	No – Baie ny Carrickey MNR is outside of the mean-max foraging range from AyM of 73.2 km (Woodward et al. 2019) for guillemot. Therefore, it can be concluded that there is no connectivity to AyM during the breeding season with respect to the guillemots associated with Baie ny Carrickey MNR. Outside of the breeding season

SITE NAME	DISTANCE TO AYM (KM)	DESIGNATION	POTENTIAL FOR CONNECTIVITY WITH AYM
			connectivity is limited due to wider mixing of guillemots with other Western Waters BDMPs populations (Western Waters BDMPs population equates to 1,139,220 individuals in the non-breeding season as defined in Furness 2015), any effect which could be apportioned to guillemots from Baie ny Carrickey MNR would almost certainly be immaterial.
		Razorbill	No – Baie ny Carrickey MNR is outside of the mean-max foraging range from AyM of 88.7 km (Woodward et al. 2019) for razorbill. Therefore, it can be concluded that there is no connectivity to AyM during the breeding season with respect to the razorbill associated with Baie ny Carrickey MNR. Outside of the breeding season connectivity is limited due to wider mixing of razorbills with other Western Waters BDMPs populations (Western Waters BDMPs population equates to 341,422 individuals in

SITE NAME	DISTANCE TO AYM (KM)	DESIGNATION	POTENTIAL FOR CONNECTIVITY WITH AYM
			the non-breeding season as defined in Furness 2015), any effect which could be apportioned to razorbill from Baie ny Carrickey MNR would almost certainly be immaterial.
Calf and Wart Bank MNR	95.9	Manx shearwater	Yes
		Kittiwake	Yes
		Puffin	Yes
		Guillemot	No – Calf and Wart Bank MNR is outside of the mean-max foraging range from AyM of 73.2 km (Woodward et al. 2019) for guillemot. Therefore, it can be concluded that there is no connectivity to AyM during the breeding season with respect to the guillemots associated with Calf and Wart Bank MNR. Outside of the breeding season connectivity is limited due to wider mixing of guillemots with other Western Waters BDMPs populations (Western Waters BDMPs

SITE NAME	DISTANCE TO AYM (KM)	DESIGNATION	POTENTIAL FOR CONNECTIVITY WITH AYM
			<p>population equates to 1,139,220 individuals in the non-breeding season as defined in Furness 2015), any effect which could be apportioned to guillemots from Calf and Wart Bank MNR would almost certainly be immaterial.</p>
		Razorbill	<p>No – Calf and Wart Bank MNR is outside of the mean-max foraging range from AyM of 88.7 km (Woodward et al. 2019) for razorbill. Therefore, it can be concluded that there is no connectivity to AyM during the breeding season with respect to the razorbill associated with Calf and Wart Bank MNR. Outside of the breeding season connectivity is limited due to wider mixing of razorbills with other Western Waters BDMPs populations (Western Waters BDMPs population equates to 341,422 individuals in the non-breeding season as defined in Furness 2015), any effect which could be apportioned to razorbill from Calf and Wart</p>

SITE NAME	DISTANCE TO AYM (KM)	DESIGNATION	POTENTIAL FOR CONNECITVTY WITH AYM
			Bank MNR would almost certainly be immaterial.
Port Erin Bay MNR	96.8	No ornithological features identified.	
Niarbyl Bay MNR	99.0	Fulmar	No – as detailed in Table 14 of Volume 2, Chapter 4: Offshore Ornithology, fulmar is not considered sensitive to any potential impacts from OWFs and therefore no potential for a likely significant effect.
West Coast MNR	102.3	Fulmar	No – as detailed in Table 14 of Volume 2, Chapter 4: Offshore Ornithology, fulmar is not considered sensitive to any potential impacts from OWFs and therefore no potential for a likely significant effect.
		Shag	No – West Coast MNR is outside of the mean-max foraging range from AyM of 13.2 km (Woodward et al. 2019) for shag. Therefore, it can be concluded that there is no connectivity to AyM during the breeding season with respect to the shag associated

SITE NAME	DISTANCE TO AYM (KM)	DESIGNATION	POTENTIAL FOR CONNECITVTY WITH AYM
			with West Coast MNR. Outside of the breeding season connectivity is limited due to wider mixing of shags with other Western Waters BDMPs populations (West of Scotland BDMPs population equates to 37,363 individuals and SW England and Wales BDMPs population equates to 13,075 in the non-breeding season as defined in Furness 2015), any effect which could be apportioned to shag from West Coast MNR would almost certainly be immaterial.
		Kittiwake	Yes
		Puffin	Yes
		Black guillemot	No – West Coast MNR is outside of the mean-max foraging range from AyM of 4.8 km (Woodward et al. 2019) for black guillemot. Therefore, it can be concluded that there is no connectivity to AyM during the breeding season with respect to the

SITE NAME	DISTANCE TO AYM (KM)	DESIGNATION	POTENTIAL FOR CONNECTIVITY WITH AYM
			black guillemot associated with West Coast MNR. Black guillemot was not recorded in the aerial digital surveys of AyM and a 4 km buffer during the non-breeding season therefore there is no connectivity of this species to AyM in the non-breeding season.
		Guillemot	No – West Coast MNR is outside of the mean-max foraging range from AyM of 73.2 km (Woodward et al. 2019) for guillemot. Therefore, it can be concluded that there is no connectivity to AyM during the breeding season with respect to the guillemots associated with West Coast MNR. Outside of the breeding season connectivity is limited due to wider mixing of guillemots with other Western Waters BDMPS populations (Western Waters BDMPS population equates to 1,139,220 individuals in the non-breeding season as defined in Furness 2015), any effect which could be apportioned to

SITE NAME	DISTANCE TO AYM (KM)	DESIGNATION	POTENTIAL FOR CONNECITVTY WITH AYM
			guillemots from West Coast MNR would almost certainly be immaterial.
		Razorbill	No – West Coast MNR is outside of the mean-max foraging range from AyM of 88.7 km (Woodward et al. 2019) for razorbill. Therefore, it can be concluded that there is no connectivity to AyM during the breeding season with respect to the razorbill associated with West Coast MNR. Outside of the breeding season connectivity is limited due to wider mixing of razorbills with other Western Waters BDMPS populations (Western Waters BDMPS population equates to 341,422 individuals in the non-breeding season as defined in Furness 2015), any effect which could be apportioned to razorbill from West Coast MNR would almost certainly be immaterial.

2.2 Impacts Apportioned to Isle of Man Marine Nature Reserves

- 3 As detailed in Table 2, the following IoM MNRs were included within assessments of AyM:
 - Ramsey Bay MNR – kittiwake and puffin.
 - Baie ny Carrickey MNR – kittiwake and puffin.
 - Calf and Wart Bank MNR – Manx shearwater (*Puffinus puffinus*), kittiwake and puffin.
 - West Coast MNR – kittiwake and puffin.
- 4 The above IoM MNRs were individually assessed for potential impacts during the breeding season only. IoM MNRs were not considered individually during the non-breeding season due to the wider mixing of seabirds from IoM colonies with seabirds from other colonies within the Western Waters BDMPs meaning that the level of impact apportioned to an individual IoM MNR would almost certainly be immaterial.
- 5 Colony counts for each IoM MNR were derived from the latest available data on the Seabird Monitoring Programme (SMP) database (JNCC, 2021).
- 6 Apportionment of predicted impacts to individual colonies was undertaken following the SNH (2018) guidance on apportionment, the details of which are provided in 5.2.5 Report to Inform Appropriate Assessment, Annex 5: Ornithology Apportioning Note (PINS ref: APP-032).

2.2.1 Disturbance and displacement

- 7 The presence of Wind Turbine Generators (WTGs) has the potential to directly disturb and displace seabirds that would normally reside within and around the area of sea where AyM is proposed to be developed. This potentially reduces the area available to those seabirds to forage, loaf and/ or moult that currently occur within and around AyM and may be susceptible to displacement from such a development. Displacement may contribute to individual birds experiencing fitness consequences, which at an extreme level could lead to the mortality of individuals.

- 8 Species considered susceptible to disturbance and displacement were consulted and agreed on by Natural Resource Wales (NRW) (as detailed in Volume 4, Annex 4.5: Offshore Ornithology Scoping and Consultation Responses (PINS ref: APP-099)). Those species within the IoM MNRs with sensitivity to disturbance and displacement, with the potential to interact with AyM, were determined to be Manx shearwater and puffin.
- 9 Seabird species vary in their response to the presence of operational infrastructure associated with OWFs, such as WTGs and shipping activity related to maintenance activities. OWFs are a new feature in the marine environment and as a result there is limited evidence as to the effects of disturbance and displacement by operational infrastructure in the long-term. Following discussion with NRW, displacement rates were agreed on (as detailed in Volume 4, Annex 4.5: Offshore Ornithology Scoping and Consultation Responses (PINS ref: APP-099)).

Manx shearwater

- 10 Most previous studies have not identified Manx shearwater as being sensitive to disturbance. Dierschke et al. (2016) classified Manx shearwater as “weakly avoiding wind farms”, although it is noted that evidence is lacking for the species. Bradbury et al. (2014) classify Manx shearwater as having “very low” population vulnerability to displacement.
- 11 Due to the limited evidence available for Manx Shearwater as to suitable displacement and mortality rates a standard precautionary rate has been taken, as recommended by NRW and in line with the updated advice from the SNCBs (2022). Therefore, the Applicant undertook assessments applying a 30-70% displacement rate to the array area plus 2 km buffer with a range of 1-10% mortality of displaced individuals. These rates were used for assessment of Manx shearwater within Volume 2, Chapter 4: Offshore Ornithology (APP - 050) and for the purpose of the assessments in this clarification note focussing on potential impacts to Manx shearwater from the IoM MNRs.
- 12 A summary of the predicted impacts in the breeding season and resulting increase in mortality relative to baseline mortality rate is provided in Table 3 for the Manx shearwater feature for the Calf and Wart Bank MNR.

- 13 The number of Manx shearwater predicted to be subject to mortality as a consequence of displacement from the array area and a 2 km buffer, when apportioned to the Calf and Wart Bank MNR in the breeding season, is significantly less than a single (>0.1) breeding adult.
- 14 When considering this level of potential impact apportioned to the Calf and Wart Bank MNR, then the prediction of less than a single breeding adult suffering displacement consequent mortality would represent at most an increase in mortality relative to the baseline mortality rate of 0.05% even when considering SNCB's upper displacement and mortality rates of 70% displacement and 10% mortality.
- 15 This level of impact would be indistinguishable from natural fluctuations in the population. There is, therefore, no potential for an Adverse Effect on Integrity (AEoI) to the conservation objectives of the Manx shearwater feature of Calf and Wart Bank MNR in relation to displacement in the operational and maintenance phase from AyM alone. Therefore, subject to natural change, Manx shearwater will be maintained as a feature in the long-term.

Table 3: Summary of predicted disturbance and displacement consequential mortality apportioned to the Manx shearwater feature of Calf and West Bank MNR.

MANX MARINE NATURE RESERVE (COUNT LOCATION)	POPULATION SIZE (BREEDING ADULTS PER ANNUM)		ESTIMATED NUMBER OF MANX SHEARWATER SUBJECT TO MORTALITY (BREEDING ADULTS)		INCREASE IN BASELINE MORTALITY RATE (%)	
	POPULATION	BASELINE MORTALITY	30% DISP; 1-10% MORT	70% DISP; 1-10% MORT	30% DISP; 1-10% MORT	70% DISP; 1-10% MORT
Calf and Wart Bank MNR (Calf of Man)	848	110	0.0 – 0.0	0.0 – 0.1	0.00% – 0.02%	0.00% – 0.05%

Puffin

- 16 With respect to puffin displacement, the Applicant considered the most appropriate rates to be 50% displacement and 1% mortality rate based on the review undertaken for Hornsea Project Four in relation to auk displacement and mortality (APEM, 2022). Assessments were also made using the SNCBs preferred range of 30 - 70% displacement and 1 - 10% mortality rate. Both the Applicant's and SNCB's preferred rates have been used to inform predicted impacts apportioned to IoM MNRs.
- 17 A summary of the predicted impacts in the breeding season and resulting increase in baseline mortality rate following the Applicant's and SNCBs preferred approach for displacement and mortality rates is provided in Table 4 for the puffin feature for all IoM MNRs assessed.
- 18 The number of puffin predicted mortalities to be displaced from the array area and a 2 km buffer apportioned to IoM MNRs in the breeding season is less than a single (>0.1) breeding adult for any MNR assessed.
- 19 When considering this level of potential impact apportioned to any of the IoM MNRs, then the prediction of at most, less than a single breeding adult suffering displacement consequent mortality would represent at most an increase in the baseline mortality rate of 0.09% even when considering SNCB's upper displacement and mortality rates of 70% displacement and 10% mortality.
- 20 This level of impact would be indistinguishable from natural fluctuations in the population. Therefore, potential for an AEoI to the conservation objectives of the puffin feature of any IoM MNR in relation to displacement in the operational and maintenance phase from AyM alone and therefore, subject to natural change, puffin will be maintained as a feature in the long-term.

Table 4: Summary of predicted disturbance and displacement consequential mortality apportioned to the puffin feature of all IoM MNRs assessed.

MANX MARINE NATURE RESERVE (COUNT LOCATION)	POPULATION SIZE (BREEDING ADULTS PER ANNUM)				ESTIMATED NUMBER OF PUFFIN SUBJECT TO MORTALITY (BREEDING ADULTS)	INCREASE IN BASELINE MORTALITY RATE (%)
	POPULATION	BASELINE MORTALITY	50% DISP; 1% MORT	30-70% DISP; 1- 10% MORT	50% DISP; 1% MORT	30-70% DISP; 1-10% MORT
Ramsey Bay MNR (Ramsey – Port Mooar)	37	3	0.0	0.0 – 0.0	0.00%	0.00% – 0.05%
Baie ny Carrickey MNR (Port St Mary – Sound)	29	3	0.0	0.0 – 0.0	0.01%	0.00% – 0.09%
Calf and Wart Bank MNR (Calf of Man)	25	2	0.0	0.0 – 0.0	0.01%	0.00% – 0.07%

MANX MARINE NATURE RESERVE (COUNT LOCATION)	POPULATION SIZE (BREEDING ADULTS PER ANNUM)				ESTIMATED NUMBER OF PUFFIN SUBJECT TO MORTALITY (BREEDING ADULTS)	INCREASE IN BASELINE MORTALITY RATE (%)
	POPULATION	BASELINE MORTALITY	50% DISP; 1% MORT	30-70% DISP; 1- 10% MORT	50% DISP; 1% MORT	30-70% DISP; 1-10% MORT
West Coast MNR (Glen Maye – Peel)	16	2	0.0	0.0 – 0.0	0.00%	0.00% – 0.07%

2.2.2 Collision risk

- 21 There is potential risk to birds from OWFs through collision with WTGs resulting in injury or fatality. This may occur when birds fly through the AyM array whilst foraging for food, commuting between breeding sites and foraging areas, or during migration.
- 22 CRM has been carried out for AyM, with detailed methods and results presented in Volume 4, Annex 4.3: Offshore Ornithology Collision Risk Modelling (PINS ref: APP-097), to provide information for seabird species of interest identified as potentially at risk and of interest for impact assessment.
- 23 CRM was undertaken using the Avian Stochastic CRM, developed by Marine Scotland (McGregor, 2018), run deterministically for each seabird species, to determine the risk of collision when in flight.
- 24 CRM accounts for several different species-specific behavioural aspects of the seabirds being assessed, including the height at which birds fly, their ability to avoid moving or static structures and how active they are diurnally and nocturnally. Details of these considerations are provided in Volume 4, Annex 4.3: Offshore Ornithology Collision Risk Modelling (PINS ref: APP-097).
- 25 In order to provide a range of values to capture variability for each species, the key input parameters were reviewed in order to provide 'mean', 'minimum' and 'maximum' estimates of collision rates for each species, with the focus of assessments being on the mean impacts. Full details of the parameters used to calculate each estimate are given in Volume 4, Annex 4.3: Offshore Ornithology Collision Risk Modelling (PINS ref: APP-097).
- 26 Species considered susceptible to collision risk were consulted and agreed on by NRW (as detailed in Volume 4, Annex 4.5: Offshore Ornithology Scoping and Consultation Responses (PINS ref: APP-099)). The species within the IoM MNRs with sensitivity to collision risk and determined to have the potential to interact with AyM is a single species, kittiwake.

- 27 The IoM Government raised a query as to why Manx shearwater was not included within the collision risk assessments for AyM in their response to the Marine Licence. The Applicant can confirm that due consideration was provided to Manx Shearwater through the assessment of this species' risk of collision from AyM and agreed upon through the evidence plan process with SNCBs (as detailed in Volume 4, Annex 4.5: Offshore Ornithology Scoping and Consultation Responses (PINS ref: APP-099)).
- 28 The consultation process recognised the low risk of collision with respect to Manx shearwater, as evidenced through multiple guidance documents recommended by SNCBs for use in determining collision risk (Furness & Wade 2013; Bradbury et al., 2014; Johnston et al., 2014). With respect to flight height distribution data for inclusion within collision risk assessments, the most comprehensive dataset available to date was produced by Johnston et al. (2014), the results of which suggest that over 99.99% of Manx shearwater fly below 22m (the minimum air gap between the sea surface and the lowest swept area of the rotor blades for AyM) above sea level, even when considering the upper 95% Confidence Limits data from Johnston et al. (2014). Manx Shearwater was, therefore, agreed with SNCBs to be scoped out for assessment of collision risk.

Kittiwake

- 29 A summary of the predicted impacts in the breeding season and resulting increase in mortality relative to the baseline mortality rate is provided in Table 5 for the kittiwake feature for all loM MNRs assessed.
- 30 The predicted kittiwake collision resultant mortality from the operation of AyM apportioned to the loM MNRs in the breeding season is significantly less than a single (>0.1) breeding adult for any loM MNR assessed.
- 31 When considering this level of potential impact, apportioned to any of the loM MNRs, then the prediction of less than a single breeding adult suffering collision consequent mortality would represent at most an increase in mortality of 0.06% relative to the baseline mortality in the breeding season.
- 32 This level of impact would be indistinguishable from natural fluctuations in the population. There is, therefore, no potential for an AEoI to the conservation objectives of the kittiwake feature of any loM MNRs in relation to collision risk in the operational and maintenance phase from AyM alone. Therefore, subject to natural change, kittiwake will be maintained as a feature in the long-term.

Table 5: Summary of predicted collision mortality values apportioned to the kittiwake feature of all IoM MNRs assessed.

MANX MARINE NATURE RESERVE (COUNT LOCATION)	MEAN COLLISIONS (MIN – MAX)	POPULATION SIZE (BREEDING ADULTS PER ANNUM)	BASELINE MORTALITY	INCREASE IN BASELINE MORTALITY RATE (%)
Ramsey Bay MNR (Ramsey – Port Mooar)	0.0 (0.0 – 0.0)	156	23	0.06% (0.02% – 0.14%)
Baie ny Carrickey MNR (Port St Mary – Sound)	0.1 (0.0 – 0.2)	1,080	158	0.06% (0.02% – 0.15%)
Calf and Wart Bank MNR (Calf of Man)	0.0 (0.0 – 0.0)	26	4	0.06% (0.02% – 0.14%)
West Coast MNR (Glen Maye – Peel)	0.0 (0.0 – 0.0)	108	16	0.05% (0.02% – 0.13%)

3 Consideration of Isle of Man Ramsar Sites

- 33 The IoM has a single Ramsar site, Ballaugh Curragh. With respect to ornithological features the site is designated for hosting the largest population of hen harriers on the IoM.
- 34 Hen harrier was considered by the Applicant for migratory collision risk assessment as detailed in Volume 4, Annex 4.4: Migratory Collision Risk Modelling (PINS ref: APP-098). As a precaution the entire UK non-breeding population (750 individuals as detailed in Wright et al. 2012) was run through 'Migropath', a bespoke migratory model developed by APEM in 2012 that predicts the number of birds from a population that may encounter one or more OWF array areas on migration.
- 35 The results from running Migropath predicted a maximum of three hen harriers may interact with the AyM array area per annum whilst on migration. Hen harrier was, therefore, screened out of further collision risk assessment as the predicted number of hen harrier interacting with AyM is less than 1% of the UK population (Volume 4, Annex 4.4: Migratory Collision Risk Modelling (PINS ref: APP-098)) and based on expert opinion the level of predicted impact from collision risk would almost certainly be less than a single individual per annum. The population run through Migropath was considered precautionary for hen harrier, although the IoM population was not specifically included within the overall population size, flight lines from the IoM intersecting the array area were included in Migropath.

- 36 On review of the Manx Birds Atlas (Sharpe et al. 2007) it suggests that many hen harriers stay within the natal area year-round, with a small number predicted to move south during the autumn and return to the loM in the spring. The extent to which the loM breeding hen harriers migrate is unknown, but a limited number of wing-tagged birds from Scotland have been observed on the loM in the non-breeding season (Sharpe et al. 2007). It is likely, therefore, that any additional increase from the few that might migrate from the loM would not materially change the prediction of the Migropath model, which was estimated at three individual hen harriers (0.4% of the UK population) considered to fly through the AyM array area.
- 37 Therefore, it can be confidently ruled that AyM alone would not have any impact on the hen harrier feature of the Ballaugh Curragh Ramsar. Therefore, subject to natural change, hen harrier will be maintained as a feature at Ballaugh Curragh Ramsar in the long-term.

4 Consideration of Isle of Man ASSI Sites

- 38 loM has Areas of Special Scientific Interest (ASSIs) designated for the populations of breeding tern species, specifically Arctic and little tern (*Sternula albifrons*) breeding at Central Ayres ASSI. Little tern also breeds within Cronk Y Bing ASSI.
- 39 Arctic tern was considered by the Applicant for migratory collision risk assessment as detailed in Volume 4, Annex 4.4: Migratory Collision Risk Modelling (PINS ref: APP-098). The population estimates with potential for connectivity with AyM on migration were identified as the North Western England and Scotland SPA populations located to the north of AyM. As a precautionary measure the total UK western non-SPA colonies, which include the loM colonies were considered for assessment and as such the migrant population estimates were derived from Appendix A of Furness (2015).
- 40 A total population of 14,763 Arctic terns were assessed for both spring and autumn migration based on a 'broad front' migratory pathway using the Band (2012) model (as detailed in Volume 4, Annex 4.4: Migratory Collision Risk Modelling (PINS ref: APP-098)). An estimated collision of less than a single individual (0.45) was found for Arctic tern per annum. Apportioning this level of impact to the loM populations of Arctic tern (100 breeding adults at The Ayres NNR – SMP database (JNCC, 2021)) would result in significantly less than a single breeding adult suffering collision consequent mortality per annum. This level of impact would be indistinguishable from natural fluctuations in the population.
- 41 Therefore, it can be confidently ruled that AyM alone would not have any impact on the Arctic tern feature of the loM ASSI sites. Therefore, subject to natural change, Arctic tern will be maintained as a feature at loM ASSI sites in the long-term.

- 42 Little tern was not considered for migratory collision risk based on the species preference to track coastlines in a narrow band from 0 to 10 km from shore whilst on migration (WWT & MacArthur Green, 2014). This was supported further in the site-specific aerial digital video surveys conducted for AyM (detailed in Volume 4, Annex 4.1: Offshore Ornithology Baseline Characterisation Report (PINS ref: APP-095)) which recorded no little terns in the AyM array area plus a 4 km buffer. Therefore, it can be confidently ruled that AyM alone would not have any impact on little tern feature of IoM ASSI sites. Therefore, subject to natural change, little tern will be maintained as a feature at IoM ASSI sites in the long-term.

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