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RSPB Cymru

Seran Davies
Marine Licensing
Natural Resources Wales

15 April 2022

By email only to:
Marinelicensing@naturalresourceswales.gov.uk

Your Ref: ORML2170

Dear Seran

MARINE AND COASTAL ACCESS ACT 2009: PART 4 MARINE LICENSING
ORML2170 Project Erebus Floating Offshore Wind Farm

Thank you for consulting the RSPB on the above.

The proposal is for a Test and Demonstration Floating Wind Farm project to be located in a highly sensitive marine environment. We understand that this project has been granted a lease as a Test and Demonstration project for floating offshore wind. The aim of this proposal is to enable a small scale Floating Offshore Wind deployment which will seek to capture data both in terms of the technology and potential impacts. This data can then be utilised in the future to help determine whether there is scope for further, large scale, commercial floating offshore wind farms in the Celtic Sea. Therefore, it is important that this project not only delivers data on the commercial viability of the technology but vital that data and evidence on ecological impacts on birds, mammals and the wider marine ecosystem is captured. However, whilst we appreciate the scale of this project is smaller than a commercial scale windfarm, and we recognise the importance of testing new technology, it should be noted that the precautionary principle needs to underpin any decision.

Given the location of the proposal and its proximity to a number of protected marine sites the RSPB objects to this application due to the potential damaging impacts on the populations of gannets, guillemots and Manx shearwaters.

We consider, that at present it is not possible to conclude that there will be no adverse effects on the integrity of the following internationally designated sites and their seabird features:

- Grassholm Special Protection Area (SPA);
- Sgomer, Sgogwm a moroedd Penfro / Skomer, Skokholm and the Seas off Pembrokeshire SPA;

The RSPB's key concerns are summarised below. We have set out detailed comments on the ES in an Annex attached to this letter. These relate principally to the assessment of potential impacts on the ornithological interests.

We consider there will be:

- Potential damaging impacts of collision mortality, barrier effects and displacement effects on populations of gannet, guillemot and Manx shearwater the designated features of Grassholm SPA (gannet) & Sgomer, Sgogwm a moroedd Penfro / Skomer, Skokholm and the Seas off Pembrokeshire SPA (guillemot and Manx shearwater).
- Potential adverse impacts on nocturnal species such as petrels and shearwaters through attraction or disorientation by lighting associated with project infrastructure.
- Potential adverse impacts on the non-breeding seabird features of SPAs including Balearic shearwater (Europe's only critically endangered seabird) through collision risk, barrier effect and displacement.

Our key methodological concerns are:

- Deficient Environmental Impact Assessment (EIA).
- Assessment methodology.
- Inadequate mitigation of impacts.

The RSPB recognises the need for more renewable energy generation as part of a range of measures to address climate change. Our view is that expansion of renewable energy must be 'in harmony with nature' so that we address global biodiversity collapse and the climate emergency in tandem. Our Energy Vision research sets out ten principles to achieve this including:

- Plan for nature: strategic spatial planning to identify suitable sites with low ecological sensitivity.
- Develop roadmaps for de-carbonisation in harmony with nature. In Wales policy choices should be informed by the effects of different scenarios on biodiversity and ecosystem resilience.

We are concerned that the ecological sensitivity of the location will result in unacceptable impacts on biodiversity.

There is reference to an Environmental Mitigation and Monitoring Plan (EMMP) with the documentation submitted. However, we have been unable to find a copy of the draft or outline EMMP as part of the submission. We therefore raise an in-principle objection the lack of an Outline EMMP. An outline EMMMP should set out the scope of the monitoring work proposed and set out a draft set of potential mitigation measures that may be undertaken if impacts on key species occur. This is critical when considering the deployment of devices in a Test and Demonstration Zone. An outline EMMP would enable us to have a greater understanding of the monitoring being looked at and the mitigation measures along with the relevant Adaptive Management Plan that may be implemented to prevent adverse ecological impacts. As part of a Test and Demonstration Zone the clarity and effectiveness of the monitoring and mitigation is vital so that informed decisions can be made not only for the future of the site in question but for the potential wider deployment of Floating Wind Technology in the Celtic Sea.

As part of the outline EMMP we would also wish to see reference to an Advisory Group being set up consisting of a cross section of organisations and the developer with the aim of reviewing and scrutinising the data collected and the adaptive management controls that may or may not need to be introduced and implemented.

We commend the effort undertaken to survey and collect baseline data. Unfortunately, despite this commendable approach to establishing a baseline for offshore ornithology, there are a number of significant concerns regarding the impact assessment and lack of sufficient detail regarding mitigation and monitoring. Our comments mainly relate to Offshore Ornithology; and Terrestrial and Coastal Ecology and Onshore Ornithology. The RSPB wishes to defer to the technical expertise of

NRW advisory on non-avian ecological chapters, especially in respect of potential changes to coastal processes and potential impacts on benthic ecology, fish and marine mammals.

We reserve the right to make further comments in future should new information be submitted in relation to the technical data or an outline EMMP. If you require further information or clarification in relation to any of the issues raised, please do not hesitate to contact me.

Yours faithfully,

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Annex 1-The RSPB's detailed comments on Project Erebus Floating Offshore Wind Farm

1.Nature Conservation Importance of the application site and surrounding area.
The application site and surrounding area is of European and national nature conservation importance. The following summarises the key designated sites and their interest features.

Grassholm SPA
The SPA is designated for its ornithological interest most notably breeding gannet. It's the only colony of Gannets in Wales and is the third biggest colony in the world.

Sgomer, Sgogwm a moroedd Penfro / Skomer, Skokholm and the Seas off Pembrokeshire SPA
(hereafter referred to as Skomer, Skokholm and the Seas off Pembrokeshire SPA)
The SPA is designated for its ornithological interest including the following qualifying breeding seabird features: Manx shearwater, storm petrel, lesser black-backed gull and puffin. Also a seabird assemblage: the main components are razorbill, guillemot, kittiwake, puffin, lesser black-backed gull, Manx shearwater and storm petrel.

2.Policy and Legislation

The Marine Policy Statement (MPS) sets out the high-level marine objectives for UK and Welsh Governments. These include living within environmental limits which requires that:

- Biodiversity is protected, conserved and where appropriate recovered and loss has been halted.
- Healthy marine and coastal habitats occur across their natural range and are able to support strong, biodiverse biological communities and the functioning of healthy, resilient and adaptable marine ecosystems.
- Our oceans support viable populations of representative, rare, vulnerable, and valued species. The MPS states that Marine Plans will contribute to meeting the objectives of the Marine Strategy Framework Directive.

The MPS (2.6.1.3) states that as a general principle, development should aim to avoid harm to marine ecology, biodiversity and geological conservation interests (including geological and morphological features), including through location, mitigation and consideration of reasonable alternatives. We consider that the Application has not demonstrated that it can achieve the objective of 'living within environmental limits' as required by the Marine Policy Statement and reflected in the objectives of the draft Wales National Marine Plan

Welsh National Marine Plan

The Vision for the WNMP includes the following objectives which are relevant to this application (emphasis added):

(3) Maximise the opportunity to sustainably develop marine renewable energy resources, helping to achieve the UK's energy security and carbon reduction objectives, whilst fully considering other's interests and ecosystem resilience.
(8) Support the achievement and maintenance of Good Environmental Status (GES).
(9) Protect, conserve, restore and enhance marine biodiversity to halt and reverse its decline.
(10) Maintain and enhance the resilience of marine ecosystems and the benefits they provide in order to meet the needs of present and future generations.

Greater consideration should be given to the full range of objectives set out in the draft WNMP to ensure that development is sustainable. Policy ENV01 states that:

> *Proposals should demonstrate how they contribute to the protection, restoration and/or enhancement of marine ecosystems.*

We consider that the application has not demonstrated how it meets the requirements of ENV_01.

3.Offshore Ornithology

The RSPB's comments on offshore ornithology are set out under the following headings:

- Baseline characterisation:
- Apportioning
- Collision risk
- Population Viability Analysis (PVA)
- Mitigation and monitoring

Baseline characterisation (App 11.1 and 11.6)

The are no details provided of the time of day that surveys were carried out. As discussed below, this is an important consideration for species with high levels of diel variation in activity.

Crucially it appears the unidentified birds were not carried forward into assessment, in other words were not included in any consideration of impact. There are a large number of these unidentified records, and this will strongly influence whether or not the impacts can be considered to be significant or not, with all impacts likely underestimates. This will particularly be the case for auk species, and without proper consideration of this it is impossible to reach conclusion or otherwise of adverse impact on guillemot population.

In addition, there is insufficient clarity as to what identification rates are referring to, for example, in table 4, species identification rates are presented but it is not clear whether these relate to birds id, to species group level (e.g. "large auk") or to absolute species level (e.g. common guillemot).

No details of how autocorrelation is dealt with in design-based abundance estimates. This is likely to be more of a problem with this site than usual assessments because transects are closer together. Furthermore, there appears to have been no underlying assumption of the abundance estimates that "transects can be treated as statistically independent random samples from the site".

These flaws with the baseline characterisation mean that a meaningful assessment cannot be carried out, and subsequent conclusions must be seen in that light.

Apportioning (App 11.2)

The RSPB welcomes the use of NatureScot apportioning method[1] and Woodward *et al.,* (2019[2]) foraging ranges, but note there is no consideration of site-specific tracking data given, as recommended by Woodward *et al (Ibid.)*. This omission is striking given that there is excellent tracking data available (from, for example, Grassholm, Skomer). These data should be considered in the apportioning calculations.

Collision risk (App 11.3)

In order to assess the mortality that could arise from avian collision with turbine blades, the Applicant has used a stochastic formulation of the Band Collision Risk Model (sCRM) (Band, 2012[3], McGregor *et al*, 2018[4]). This approach is welcomed by the RSPB. This method combines a series of parameters describing the turbine design and operation with estimates of a birds size and behaviour

[1] NatureScot 2018. Interim Guidance on apportioning impacts from marine renewable developments to breeding seabird populations in SPAs https://www.nature.scot/doc/interim-guidance-apportioning-impacts-marine-renewable-developments-breeding-seabird-populations

[2] Woodward, I., Thaxter, C.B., Owen, E. & Cook, A.S.C.P. 2019. Desk-based revision of seabird foraging ranges used for HRA screening, Report of work carried out by the British Trust for Ornithology on behalf of NIRAS and The Crown Estate, ISBN 978-1-912642-12-0

[3] Band, B. 2012. Using a Collision Risk Model to Assess Bird Collision Risks for Offshore Wind Farms. Report by British Trust for Ornithology (BTO). Report for The Crown Estate

[4] McGregor, R.M., King, S., Donovan, C.R., Caneco, B. and Webb, A. (2018) A Stochastic Collision Risk Model for Seabirds in Flight. Report to Marine Scotland Science

to generate a predicted number of birds that would collide with a turbine over a given time period. The stochastic formulation was initially developed by Masden (2014[5]) and then produced in an easier to use interface by McGregor *et al,* (2018[4]). The stochastic version allows for some account of uncertainty and variability in parameters to be made.

Due to high sensitivity of the Band model to variation in input parameters, it is crucial for assessment that these are accurately defined. Whilst the RSPB agrees with the use of the sCRM in the assessment, there are issues with the parameters used that mean we cannot have confidence in the accuracy of the consequent predicted mortalities. These parameters are Avoidance Rate flight heights, flight speeds, and Nocturnal Activity Factor. We also have concerns with the manner that risk has been assessed for Manx shearwater.

Avoidance Rate

The input parameters related to bird size and behaviour include a parameter known as "Avoidance Rate". This is defined by Band (2012[3]) as is the inverse of the ratio of number of actual collisions to number of predicted collisions. As such "Avoidance Rate" is a misnomer; it is a catch all term for the inconsistency between predicted and actual mortalities, an inconsistency that can be derived from a variety of sources, including avoidance behaviour, survey error and model misparameterisation. While Avoidance Rate has been considered as the input parameter with the greatest influence on predicted mortalities (Chamberlain *et al*., 2006[6]), recent sensitivity analysis by Masden *et al*., (2021[7]) demonstrated that other behavioural parameters, such as flight height and speed also had a similar level of influence on the predicted mortalities. This is, however, not to understate the importance of Avoidance Rate; Masden et al. (*Ibid.*), demonstrated that a 10% reduction in the avoidance rate of Lesser-black backed gulls, from 0.997 to 0.9873 would result in a 3271% increase in the predicted number of collisions at an offshore wind farm in the Irish Sea.

The Applicant has used Avoidance Rates in the sCRM, as recommended by the Statutory Nature Conservation Bodies (SNCBs 2014[8]) including Natural Resources Wales. Whilst the RSPB agree with the majority of the advised rates including the use of a 98.9% avoidance rate for non-breeding gannets, in our opinion in the breeding season, a 98% avoidance rate is more appropriate for gannet. This is because the figures used for the calculation of avoidance rates advocated by the SNCBs are largely derived from the non-breeding season for gannet (Cook *et al*., 2014[9] and Cook *et al*., 2018[10]) In order to provision chicks, gannets will need to forage more during the breeding season and will be constrained by central place foraging. Such behavioural differences are likely to result in changes in avoidance behaviour (Cook *et al*., 2018, *Ibid*).

The current evidence of a strong macro avoidance of wind farms by gannets, established from observed behaviour, is derived from non-breeding birds (e.g., Dierske *et al* 2016[11]). The evidence for macro avoidance during the breeding season is limited with the exception of a study of gannets breeding on Helgoland (Peschko *et al*. 2021[12]). However, it is unclear from this study what the breeding status of the tracked birds was or how their behaviour differed from what would have been expected pre-construction as two of the three wind farms were already operational during the first year of tracking. Digital aerial surveys pre- and post-construction at Beatrice offshore wind farm

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[5] Masden, E. (2015). Scottish Marine and Freshwater Science Vol 6 No 14: Developing an avian collision risk model to incorporate variability and uncertainty. Published by Marine Scotland Science. DOI: 10.7489/1659-1.

[6] Chamberlain, D. E., Rehfisch, M. R., Fox, A. D., Desholm, M., & Anthony, S. J. (2006). The effect of avoidance rates on bird mortality predictions made by wind turbine collision risk models. *Ibis*, *148*, 198-202.

[7] Masden, E.A., Cook, A.S.C.P., McCluskie, A., Bouten, W., Burton, N.H.K, Thaxter, C. 2021. When speed matters: the importance of flight speed in an avian collision risk model. Environmental Impact Assessment Review, 90

[8] SNCBs. 2014. Joint Response from the Statutory Nature Conservation Bodies to the Marine Scotland Science Avoidance Rate Review. https://www.nature.scot/sites/default/files/2018-

[9] Cook, A S C P, Humphreys, E. M., Masden, E. A., & Burton, N. H. K. 2014. The Avoidance Rates of Collision Between Birds and Offshore Turbines. Edinburgh

[10] Cook, A.S.C.P., Humphreys, E.M., Bennet, F., Masden, E.A., Burton, N.H.K. 2018 Quantifying avian avoidance of offshore wind turbines: Current evidence and key knowledge gaps. Marine Environmental Research, 140, 278-288.

[11] Dierschke, V., Furness, R. W., Garthe, S. 2016. Seabirds and offshore wind farms in European waters: Avoidance and attraction. Biological Conservation, 202, 59–68

[12] Peschko, V., Mendel, B., Merker, M., Dierschke, J., Garthe, S. 2021. Northern gannets (Morus bassanus) are strongly affected by operating offshore wind farms during the breeding season. Journal of Environmental Management. 279

in the Moray Firth, Scotland show a decrease in gannet abundance post construction but the provenance, breeding status or age of the displaced birds is unclear as is any seasonal change in displacement (MacArthur Green 2019[13]) and the results are only for a single breeding season. Despite this evidence of macro- avoidance recent work in Belgian offshore windfarms has shown that potentially habituation to the presence of turbines can result in lower macro avoidance (Vanerman *et al.,* 2021[14])

There is evidence that the foraging movements and behaviour of gannets will vary in relation to stage of the breeding season in response to changes in the distribution and abundance of prey and changing constraints as they progress from pre-laying to chick-rearing (Lane et al. 2020[15]). GPS tracking of gannets breeding on the Bass Rock between 2010 and 2021 has shown variation in the two-dimensional foraging behaviour of birds across the breeding season (prior to chick rearing and chick-rearing), between sexes, and between years (Cleasby et al. 2015a[16], Lane et al. 2020[15], Lane and Hamer 2021[17]). Three-dimensional tracking of gannets during chick-rearing has also revealed that flight height and flight speed both vary according to behaviour, sex and wind conditions (Cleasby et al. 2015b[18], Lane et al. 2019[19], Lane et al. 2020[15]) and similar patterns have been recorded in other seabirds (Masden et al. 2021[20]). Because any error in the use of flight height and flight speed as input parameters in the sCRM should be corrected for in the use of Avoidance Rate, any seasonal variation in these parameters should also be reflected in variation in the Avoidance Rate, in the absence of any actual evidence from the breeding season.

Flight heights

Flight heights for the assessment of collision risk are typically drawn from Johnstone *et al,* (2014[21]) with *corrigendum.* This source collected data from a large number of offshore surveys and using a robust statistical methodology obtained height distributions, suitable for use in the sCRM. This is the preferred source as there is considerable doubt over the accuracy of estimations of flight height obtained either boat based or digital platforms and Johnstone *et al*, (*Ibid*.)to some extent, take into account these uncertainties. However, the Applicant has used a novel method of deriving flight height from digital aerial surveys. This method has not been properly validated, has not been accepted by the Statutory Nature Conservation Bodies or been accepted in any other offshore windfarm consent. As such, while it can provide some contextual interest, it is not acceptable for use in deciding the significance or otherwise of a development. Without the use of the recommended source of flight height data, it is impossible to draw conclusions as to the significance or otherwise of impacts arising from the proposed development.

Flight speeds

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[13] MacArthur Green. 2019. Beatrice Offshore Wind Farm Year 1 Post-construction Ornithological Monitoring Report 2019

[14] Vanermen, N.; Courtens, W.;.; Van de walle, M.; Verstraete, H.; Stienen, E. 2021. Macro-avoidance of GPS-tagged lesser black-backed gulls and potential habituation of auks and gannets. In Degraer, Brabant, Rumes & Vigin (eds) 2021. *Environmental Impacts of Offshore Wind Farms in the Belgian Part of the North Sea, avoidance and habitat use at various spatial scales.* Brussels: Royal Belgian Institute of Natural Sciences, OD Natural Environment, Marine Ecology and Management

[15] Lane, J.V., Jeavons, R., Deakin, Z., Sherley, R.B., Pollock, C.J., Wanless, R.J., Hamer, K. C., 2020. Vulnerability of northern gannets to offshore wind farms; seasonal and sex specific collision risk and demographic consequences. Marine Environmental Research. 162.

[16] Cleasby, I.R., Wakefield, E.D., Bodey, T.W., Davies, R.D., Patrick, S.C., Newton, J., Votier, S.C., Bearhop, S., Hamer, K.C. 2015a. Sexual segregation in a wide-ranging marine predator is a consequence of habitat selection. Marine Ecology Progress Series, 518, 1-12

[17] Lane, J.V. and Hamer, K.C. 2021. Annual adult survival and foraging of gannets at Bass Rock, Scotland: Report to the Ornithology subgroup of the Forth and Tay Regional Advisory Group (FTRAG-O) – October 2021

[18] Cleasby, I.R., Wakefield, E.D., Bearhop, S., Bodey, T.W., Votier, S.C., Hamer, K.C., 2015b. Three-dimensional tracking of a wide-ranging marine predator: flight heights and vulnerability to offshore wind farms. Journal of Applied Ecology, 52, 1474–1482

[19] Lane, J.V., Spracklen, D.V., Hamer, K.C., 2019. Effects of windscape on three-dimensional foraging behaviour in a wide-ranging marine predator, the northern gannet. Marine Ecology Progress Series, 628, 183–193.

[20] Masden, E.A., Cook, A.S.C.P., McCluskie, A., Bouten, W., Burton, N.H.K, Thaxter, C. 2021. When speed matters: the importance of flight speed in an avian collision risk model. Environmental Impact Assessment Review, 90

[21] Johnston, A., Cook, A. S., Wright, L. J., Humphreys, E. M., & Burton, N. H. (2014). Modelling flight heights of marine birds to more accurately assess collision risk with offshore wind turbines. *Journal of Applied Ecology*, *51*(1), 31-41.

In the assessment of gannet collision risk, the Applicant has used flight speed derived from tracking work carried out at Grassholm (App. 11-7[22]). While the RSPB welcome the inclusion of this analysis, any change from the recommended parameters of the CRM should be presented alongside those recommended values, rather than instead of, to provide contextual information indicative of variability and confidence in the predicted mortalities. Furthermore, the analysis of flight speed carried out in App. 11.7. as a mean using distance covered between successive location fixes. These fixes could be separated by between 1 to 3 minutes, and so do not take into account any tortuosity in flight path. For example, if the time between fixes is the same, a bird flying directly between two locations recorded by the loggers will be flying slower than a bird taking a meandering path between them. Gannets are known to show different levels of flight tortuosity dependent on behaviour (Cleasby *et al*., 2015b[18]). A preferred method of calculating flight speed would be to derive "instantaneous flight speed" based on Doppler-shift information derived from the movement of the tag relative to the movement of the satellites (Safi *et al*., 2013[23]).

As such, while the analysis presented in App. 11-7 provides welcome contextual information, without the use of the recommended source of flight speed data, it is impossible to draw conclusions as to the significance or otherwise of impacts arising from the proposed development.

Nocturnal Activity Factor

The baseline characterisation of the site has been carried out using daytime surveys, as is standard for offshore wind assessments. It has been assumed that the sampled bird activity is persistent throughout the daylight hours, and in order to account for lower activity at night a Nocturnal Activity Factor has been applied, again as is standard and recommended by the model author (Band 2012[24]). Nocturnal Activity Factors based on Garthe and Hüppop (2004[25]) are recommended for use in the sCRM, with the exception of gannets, where more recent work (Furness *et al.,* 2018[26]) has provided factors derived from tracking of gannets. These are 8% during the breeding season and 3% in the non-breeding season. Similarly the Applicant has examined data from a long term tracking study at Grassholm (App. 11.7) and used a Nocturnal Activity Factor of 0% in the sCRM. The Grassholm tagging study does show low activity in darkness, but this must be seen in the context of the definition of nightime used in the collision model, which is sunset to sunrise. Gannet flight activity differs considerably between daytime, civil twilight, and darker periods (nautical twilight, astronomical twilight and night). In the summer there can be extended period of twilight where gannet will still be active but that the sCRM considers to be "night-time". As such, it is inappropriate to base a revised model on these data without a full exploration of the activity patterns in the context of different definitions of day and night and there use in the sCRM. Therefore conclusions as to the significance or otherwise of impacts arising from the proposed development cannot be drawn.

Manx shearwater

Despite being the third most commonly recorded species in the Application footprint, the RSPB do not consider that potential impacts on Manx shearwater have been properly considered, in particular collision risk. Fundamental to the consideration of collision risk for this species is the extent to which nocturnally active seabirds, such as Manx shearwaters, may be attracted to the illuminations required for turbines, support vessels and the construction or expansion of ports. Such

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[22] Volume 4(Confidential), Technical Appendix 11.7: Langley L,and Votier S.,July 2021. Grassholm Gannet Project –Analysis of tracking data to inform Erebus EIA (Heriot-Watt University)

[23] Safi, K., Kranstauber, B., Weinzierl, R., Griffin, L., Rees, E.C., Cabot, D., Cruz, S., Proaño, C., Takekawa, J.Y., Newman, S.H. and Waldenström, J., 2013. Flying with the wind: scale dependency of speed and direction measurements in modelling wind support in avian flight. *Movement Ecology*, *1*(1), pp.1-13.

[24] Band, B. 2012. Using a Collision Risk Model to Assess Bird Collision Risks for Offshore Wind Farms. Report by British Trust for Ornithology (BTO). Report for The Crown Estate.

[25] Garthe, S., & Hüppop, O. (2004). Scaling possible adverse effects of marine wind farms on seabirds: developing and applying a vulnerability index. *Journal of applied Ecology*, *41*(4), 724-734.

[26] Furness, R. W., Garthe, S., Trinder, M., Matthiopoulos, J., Wanless, S., & Jeglinski, J. (2018). Nocturnal flight activity of northern gannets Morus bassanus and implications for modelling collision risk at offshore wind farms. *Environmental Impact Assessment Review*, *73*, 1-6.

attraction will cause behaviour change, which could in turn increase collision risk, for example if birds fly higher when attracted to lights.

There is also abundant evidence of light-induced disorientation of Manx shearwaters. This evidence includes the grounding of fledglings in lit areas of the village on Hirta, St Kilda (Miles *et al*., 2010[27]) and collision with lighthouses and other illuminated structures (Guilford et al., 2019[28], Archer et al., 2015[29]). If light-induced disorientation leads to individual birds circling the navigation lights on the nacelle or tower of turbines for protracted periods (as has been reported for birds disorientated by lighthouses or gas flares) the probability of collision with turbine blades or other surfaces is vastly increased. Such light induced behavioural change invalidates the simplistic assumptions of bird behaviour in the vicinity of turbines of the Band CRM. For example, the model assumes that birds will fly at a fixed height and speed once through the rotor swept area, in a direction perpendicular to the turbine blades. Light-induced changes in flight height, disorientation and circling flight behaviour mean that this assumption would not be met.

Manx shearwater can be active throughout the day and night and with different levels of activity at different times. For example for birds tracked from Skomer, diving occurred during the day and peaked in the evening (Shoji et al., 2016), while nocturnal foraging was observed from tracking of birds from High Island, Ireland (Kane et al., 2020) Dense flocks also on the sea in the vicinity of breeding colonies from late afternoon, before coming ashore after nightfall. This so-called "rafting" behaviour was studied using radio telemetry of chick-reading adults at Rum, Bardsey and Skomer (McSorley et al., 2008[30], Wilson et al., 2009[31]). Further evidence of diel variation in activity is presented by the Applicant in App 11.8[32], Figure 4.6., showing diurnal variation in flux across different breeding stages.

These diel variations in activity mean that the somewhat limited amount of time aerial surveys were carried out, restricted to the hours of full light are unlikely to properly characterise the activity of Manx shearwater at the Application site. While the Applicant has not presented the timing of survey flights, in other applications these have generally taken place between mid-morning and mid-afternoon. For these reasons the RSPB does not have confidence in the baseline densities of Manx shearwater presented, and for the reasons given above does not think that the collision risk modelling will predict an accurate level of mortality. Therefore it is impossible to make any conclusions as to the significance of impacts

Balearic shearwater

The applicant has not considered potential impacts on Balearic shearwater, Europe's only endemic IUCN critically endangered seabird. While these were not detected during the baseline characterisation surveys, this may because of nocturnal and crepuscular activity precludes detection, as described, or potentially because they are confused during survey with Manx shearwater, which they resemble. The Celtic Sea is known to be an important area for wintering Balearic shearwaters with recent work demonstrating that the area around the Celtic sea front is likely to be a hot-spot in

[27] MILES, W., MONEY, S., LUXMOORE, R. & FURNESS, R. W. 2010. Effects of artificial lights and moonlight on petrels at St Kilda. *Bird Study,* 57**,** 244-251.
[28] GUILFORD, T., PADGET, O., BOND, S. & SYPOSZ, M. 2019. Light pollution causes object collisions during local nocturnal manoeuvring flight by adult Manx Shearwaters Puffinus puffinus. *Seabird,* 31**,** 48-55
[29] ARCHER, M., JONES, P. H. & STANSFIELD, S. D. 2015. Departure of Manx Shearwater *Puffinus puffinus* fledglings from Bardsey, Gwynedd, Wales, 1998 to 2013. *Seabird,* 28**,** 43-47
[30] MCSORLEY, C., WILSON, L., DUNN, T., GRAY, C., DEAN, B., WEBB, A. & REID, J. 2008. Manx shearwater *Puffinus puffinus* evening rafting behaviour around colonies on Skomer, Rum and Bardsey: its spatial extent and implications for recommending seaward boundary extensions to existing colony Special Protection Areas in the UK. JNCC Report number 406. Peterborough: Joint Nature Conservation Committee
[31] WILSON, L. J., MCSORLEY, C. A., GRAY, C. M., DEAN, B. J., DUNN, T. E., WEBB, A. & REID, J. B. 2009. Radio-telemetry as a tool to define protected areas for seabirds in the marine environment. *Biological Conservation,* 142**,** 1808-1817
[32] Volume 4(Confidential),Technical Appendix 11.8:Davies K, Padget O, and Guilford T,July 2021. An analysis of Oxnav Manx shearwater tracking data in relation to the Erebus project (Universityof Oxford)

UK waters (Philips *et al*., 2021[33]) The RSPB do, however, welcome the consideration of the species given in App 11-8[34], and note that this concludes that species will have similar risks to Manx shearwaters and that the Application is "in an area likely to be of particular importance for this rare and critically endangered species".

4.Terrestrial and Coastal Ecology and Onshore Ornithology

Main point: The cable landfall options avoid the chough SPA but crosses Angle Peninsula coast SSSI – with wintering chough feature.

There are potential adverse impacts on the breeding and foraging chough within Angle Peninsula Coast SSSI and Castlemartin Coast SPA, as a result of disturbance and loss of foraging habitat from onshore construction works associated with the cable landfall and grid connection within the SSSI and in proximity to the SPA. We acknowledge the applicant's efforts to assess and mitigate the risks of impact on the chough population.

However, there remains a high level of uncertainty in relation to the impact of the cable landfall on habitats, owing to an indecision on which working methods will be applied during cable landfall works.

Chough

A comprehensive programme of ornithological survey work along the route of the cable landfall and grid connection has been undertaken although there are some limitations which are acknowledged in the ES.

Based on the results of the surveys, the cable landfall options avoid chough breeding sites and key foraging areas. The cable landfall options avoid the Castlemartin Coast SPA (designated for its breeding population of chough). Whereas the options do impinge/overlie Pembrokeshire Marine SAC and Angle Peninsula Coast SSSI (SSSI designated for wintering chough).

Habitat impacts

There are two cable landfall options at West Angle Bay, identified as Northern and Southern landfalls. Both of which impinge/overlie the Angle Peninsula Coast SSSI and Pembrokeshire Marine SAC. Based on the information provided, it is not clear on the extent of impact, in terms of direct permanent or temporary loss or fragmentation, on SSSI and SAC habitat features. This is dependent on whether horizontal direct drilling (HDD) is possible: a decision the applicant has not yet made and therefore is not able to provide clarity on in its ES and HRA documentation. If HDD is not possible and trenching is adopted in the Northern landfall, the impact on designated site habitats is not clear, including the extent and permanence of any habitat loss.

Other comments

We wish to draw you attention to the following anomaly. Summary 20.10.1.1 incorrectly states "……… *The onshore site does not overly any statutory or non-statutory nature conservation designation, although three statutory sites designated for their ecological features lie within 5km of the onshore site boundary.*"

The offshore cable corridor passes through the Angle Peninsula Coast SSSI while making landfall, as stated in Table 20.4 and elsewhere in the chapter.

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[33] Phillips, J.A., Banks, A.N., Bolton, M., Brereton, T., Cazenave, P., Gillies, N., Padget, O., van der Kooij, J., Waggitt, J. and Guilford, T., 2021. Consistent concentrations of critically endangered Balearic shearwaters in UK waters revealed by at-sea surveys. *Ecology and evolution*, *11*(4), pp.1544-1557.

[34] Volume 4(Confidential),Technical Appendix 11.8:Davies K, Padget O, and Guilford T,July 2021. An analysis of Oxnav Manx shearwater tracking data in relation to the Erebus project (Universityof Oxford)

Disparity of ornithological assessment between ES chapters: The nature conservation value of species referred to in Chapter 20 relate to the UK conservation status originating from Birds of Conservation Concern 4 (2015 update). Whereas Chapter 11 Offshore Ornithology refers to both the UK and Wales conservation status. It would have been helpful to be mirror the Offshore Ornithology chapter and include reference to Birds of Conservation Concern in Wales 3 (2016 update) which is specific to Wales.