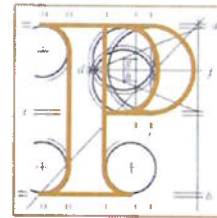


Our Case Number: ABP-319866-24

Planning Authority Reference Number:



**An
Bord
Pleanála**

Irish Whale and Dolphin Group (IWDG)
Merchant's Quay
Kilrush
Co. Clare
V15 E762

Date: 19 August 2024

Re: Proposed development known as North Irish Sea Array ("NISA") Offshore Wind Farm
Located off the coast of Counties Dublin, Meath and Louth (www.northirishsearraysid.ie)

Dear Sir / Madam,

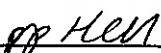
An Bord Pleanála has received your submission in relation to the above-mentioned proposed development and will take it into consideration in its determination of the matter.

The Board will revert to you in due course in respect of this matter. Please be advised that copies of all submissions/observations received in relation to the application will be made available for public inspection at the offices of the coastal planning authority and at the offices of An Bord Pleanála when they have been processed by the Board.

More detailed information in relation to marine infrastructure development can be viewed on the Board's website: www.pleanala.ie.

If you have any queries in the meantime, please contact the undersigned officer of the Board or email marine@pleanala.ie quoting the above mentioned An Bord Pleanála reference number in any correspondence with the Board.

Yours faithfully,


Ellen Moss
Executive Officer
Direct Line: 01-8737285

OA15

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64 Sráid Maoilbhríde	64 Marlborough Street
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D01 V902	D01 V902

Ellen Moss

From: Stephen Comerford <stephen.comerford@iwdg.ie>
Sent: 09 August 2024 14:55
To: Marine
Subject: NISA EIAR IWDG comments
Attachments: IWDG comments NISA EIAR.pdf
Categories: Ellen Case

Caution: This is an **External Email** and may have malicious content. Please take care when clicking links or opening attachments. When in doubt, contact the ICT Helpdesk.

Please find attached the IWDG submission on the NISA windfarm planning application EIAR.

Please note that some elements of this submission inevitably overlap with our previously submitted comments on the Oriel project. In an attempt to present our opinions in a more easily digestible way, I have divided this application into two sections; the first relates directly to the NISA project, and the second is a more general discussion on underwater noise, cetaceans, mitigation, regulation, ORE activities etc which is intended to inform ABP about the relevant background information.

Please also note that this general discussion section will evolve over time and is likely to incorporate new information from submission to submission.

Feel free to contact me to discuss any of this.

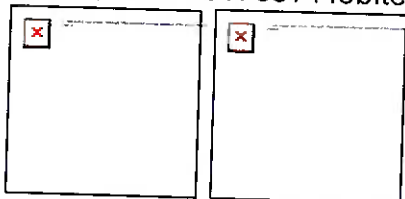
Regards

Stephen

--

Dr Stephen Comerford
Marine Policy Officer
Irish Whale and Dolphin Group
Merchants Quay, Kilrush, Co Clare, Ireland, V15 E762

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An Bord Pleanála,
64 Marlborough St
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09 August 2024

IWDG comments on North Irish Sea Array Wind Farm EIAR

The Irish Whale and Dolphin Group

The Irish Whale and Dolphin Group (IWDG) was established in December 1990 and is an all-Ireland group dedicated to the conservation and better understanding of cetaceans (whales, dolphins and porpoise) in Irish and other waters through increasing awareness, research, education, welfare activities and collaboration (see <http://iwdg.ie>).

The IWDG welcomes the opportunity to comment on the Environmental Impact Assessment Report submitted by Statkraft Ireland Ltd and Copenhagen Infrastructure Partners P/S to An Bord Pleanála as part of their planning application for the North Irish Sea Array Wind Farm Project. The IWDG recognises the importance of developing offshore wind in Irish waters in combating climate change and securing our energy supply. The Group has consistently engaged with and supported the efforts of Government through DECC and DHLGH while advocating to minimise the environmental effects of surveying, construction, operation and decommissioning of ORE projects.

Underwater noise

Of most concern to the IWDG throughout the phases of ORE development is underwater noise during piling, geophysical surveys and UXO detonation, and these are the topics addressed in this response to the NISA EIAR. Whales, dolphins and porpoises are acoustic animals, relying on their hearing for hunting, navigation,



communication and predator avoidance. Excessive noise in the marine environment is a profound disrupter for cetaceans which at the lower end of the intensity scale can cause stress and changes in behaviour, and may prevent feeding, cause avoidance, and disrupt communication. At the upper end it can cause temporary or permanent deafness (thereby disabling the animal), physical trauma, or death (e.g. Gordon et al., 2004; Jepson et al., 2003; Nowacek et al., 2007; Richardson et al., 1995).

The construction of NISA windfarm will involve hammering steel piles deep into the substrate using thousands of strikes to provide foundations for the wind turbines and substation. Without mitigation this will create high levels of low frequency impulsive noise propagating through the seabed and water column with the potential to negatively affect marine mammals (Bailey et al., 2010; Dähne et al., 2013; Nowacek et al., 2007; NMFS, 2018). Geophysical surveying and UXO detonation also create underwater noise at levels and frequencies at which injury to marine mammals can occur (DAHG, 2014; JNCC, 2017) and these are discussed in this submission.

Submission scope

Acknowledging the scale of the application the Group has considered the following documents:

- Non-Technical Summary
- Chapter 2 EIA and Methodology for the Preparation of an EIAR
- Appendix 2.4 Design Flexibility Opinion
- Chapter 14 Marine Mammal Ecology
- Appendix 14.1 Underwater Noise Modelling Report
- Appendix 14.4 Marine Mammal Management Protocol



These are analysed and discussed in the next paragraphs under the heading *NISA application*, following which the section *General discussion* includes a review of issues relating to some technical aspects of underwater noise and its mitigation, and the developing regulatory framework during modern construction projects at-sea. While the *General discussion* section does not specifically refer to the NISA windfarm EIAR and planning application, it will serve to provide relevant background information on what is a highly specialised topic.

NISA application

Population estimates

The populations of harbour porpoise, common dolphin, bottlenose dolphin, minke whale, harbour seals and grey seals are described in section 14.3 *Baseline Environment* of Chapter 14 *Marine Mammal Ecology*. The IWDG is primarily concerned with the welfare of cetaceans and will not comment on seals in this submission. Population estimates for the above-named animals are derived from a number of sources, including dedicated site surveys, and carried forward to quantitative impact assessment with the aim of estimating the number of animals that could be impacted by an activity. The IWDG notes the disparity of density estimate results between site-specific surveys and independent surveys (e.g. SCANS IV, SCANS III), broad confidence intervals, and the exclusion of other marine mammal species previously recorded in the area (i.e. fin whale, humpback whale, killer whale). It is understood that the EIAR must focus on the animals most often encountered in the area of the proposed windfarm, and must quantitatively analyse the available data, nevertheless the IWDG assumes that cetaceans are ubiquitous, that any species may be present at any time, and that mitigation must be planned on that basis.



Underwater noise predictive modelling

Appendix 14.1 *Underwater Noise Modelling Report* describes a systematic assessment of the responses of marine mammals to underwater noise. Here, marine mammals are divided into functional groups according to what is understood about the range of sound frequencies at which they communicate, echolocate, and are presumably most sensitive: low frequency mammals such as baleen whales; high frequency animals such as dolphins and toothed, beaked and bottlenose whales; very high frequency animals, chiefly porpoises; and phocid carnivores in water, which are seal species (Southall et al., 2019).

A standard dual criteria approach is employed, peak sound pressure levels (SPL_{pk}) and cumulative sound exposure levels (SEL_{cum}) are considered in relation to the sensitivities of the four functional groups of animals, and to key metrics describing injury to the animals. Permanent threshold shift (PTS) is the most serious, and is defined by permanent deafness. Temporary threshold shift (TTS) may be non-fatal, but implies an induced disability from which the animal recovers over time. Both PTS and TTS are classed as injury to an animal, and are therefore precluded under Irish guidance (DAHG, 2014). In addition, the NOAA (2005) criterion for Level B harassment was included to assess behavioural disturbance in marine mammals. Fish are also included in the assessment according to the criteria from Popper et al. (2014) but are not considered in this submission.

Noise from impact piling during construction was modelled by Subacoustech (<https://www.subacoustech.com>) using their INSPIRE v5.2 semi-empirical broadband noise propagation model. The numerical modelling has been refined using datasets from real-time monitoring of piling events, thereby iteratively improving the model's performance. Given the "black box" nature of the model as presented, the IWDG is unable to offer any opinion other than to note that good agreement between model predictions and measured sound levels during piling events are presented in section 3.1 *Modelling confidence* (Figure 3-1).

The sound modelling results are somewhat complicated by the necessity to present the sound ranges for two construction scenarios. In Chapter 2 *EIA and Methodology for the Preparation of an EIAR* Section 2.8 *Unconfirmed details* the following is stated: *"The assessments in this EIAR are based on a design which incorporates some details which have not been confirmed and where design flexibility has been accepted...To accommodate the design flexibility required, two distinct project options are proposed for the offshore elements of the proposed development. The key differences between the two project options relate to Wind Turbine Generator (WTG) number, WTG dimensions, WTG layout. OSP foundation type and dimensions. A fixed WTG layout for each of the two project options is included in the application."*

The two scenarios modelled, Options 1 and 2, are described in Table 1 below:

Table 1: High level overview of the two project options for the proposed development (from EIAR Volume 1 Non-technical summary)

Parameter	Project Option 1	Project Option 2
Number of Wind Turbine Generators (WTGs) (Turbines)	49	35
WTG tip height (m above lowest astronomical tide)	290	316 outside aviation restricted zone, 311 inside aviation restricted zone*
Rotor Diameter (m)	250	276
Hub height (m above lowest astronomical tide)	165	178
WTG Foundation type	Monopiles	Monopiles or multi-leg pin piled jackets (hereafter referred to as 'jackets')
Number of OSPs	1	1
OSP foundation type	Monopile(s) or jacket foundation	Monopile(s) or jacket foundation
Offshore export cable length (km)	18	18
Inter-array cable length (km)	111	91

The critical difference between the options from a the standpoint of underwater noise is the type of foundation chosen for the turbines in Option 1 all foundations (with the possible exception of the OSP foundation) will be monopiles of 12.5m diameter, in Option 2 the design parameters may include 12.5m monopiles or pin-piled jacket foundations (multi-leg with 6m diameter piles).



For monopile foundation installation, the largest marine mammal PTS impact ranges predicted by the modelling are at the SE location. Maximum PTS ranges are predicted for LF and VHF cetaceans out to 26 km and 15 km respectively. The longest distance at which TTS is predicted to occur is 105 km for LF animals in the NE. Level B harassment (160dB SPL_{rms}) was predicted to occur at both the SE and NE locations at a maximum range of 48km. For the multi-leg foundations, the largest marine mammal PTS impact ranges are predicted at the NE and SE locations with maximum PTS ranges out to 17 km for LF cetaceans and 9.5 km for VHF cetaceans. Highest TTS estimation was 95km for LF animals in the SE. Level B harassment (160dB SPL_{rms}) was predicted to occur at 42km max at the SE and NE locations (see Table 2 below).

Table 2: Summary of the weighted SEL_{cum} maximum impact ranges for marine mammals using the Southall et al. (2019) impulsive criteria assuming a fleeing animal (taken from Tables 4-2 to 4-49 Appendix 14-1).

Location	Threshold	Option 1 Max range (km)	Option 2 Max range (km) Single pile scenario	Option 2 Max range (km) Two piles scenario
NE	PTS LF	26	15	17
	PTS VHF	14	7.3	9.1
	TTS LF	105	91	94
	TTS VHF	81	62	70
	Level B (160dB)	48	42	42
NW	PTS LF	18	9.5	11
	PTS VHF	10	4.7	6
	TTS LF	92	79	81
	TTS VHF	70	51	59
	Level B (160dB)	41	36	36
SE	PTS LF	26	15	17
	PTS VHF	15	7.6	9.5
	TTS LF	102	95	95
	TTS VHF	83	61	71
	Level B (160dB)	48	42	42
SW	PTS LF	22	13	15
	PTS VHF	13	6.5	8.2
	TTS LF	99	90	91
	TTS VHF	78	58	66
	Level B (160dB)	45	40	40

These ranges are the maximum as modelled for the occurrence of PTS, TTS and Level B harassment (NOAA, 2005; Southall et al, 2019) and can be taken as the worst-case scenario for unmitigated piling. They indicate ranges of injury orders of magnitude greater than can be effectively mitigated for using traditional methods such as visual pre-watches prior to piling by marine mammal observers (MMOs), acoustic monitoring by passive acoustic monitoring (PAM), or by causing animals to



flee by introducing targeted noise into the environment using acoustic deterrent devices (ADDs).

MMMP

Appendix 14.4 *Marine Mammal Mitigation Protocol* takes a radically different approach to the *Underwater Noise Modelling Report* (Appendix 14.1) which underpins it, by discounting TTS or Level B harassment, failing to mention them and implying that PTS is the only injury to marine mammals for which the project is required to mitigate. This is contrary to the Irish Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters (DAHG, 2014); the relevant section of which is reproduced here: “Under current legislation in Ireland, it is an offence to disturb or injure a marine mammal (see section 1.2) whether this occurs via introduced sound or another anthropogenic source. The induction of temporary or permanent tissue damage and a Temporary Threshold Shift in hearing sensitivity, which can have negative effects on the ability to use natural sounds (e.g., to communicate, navigate, locate prey) for a period of minutes, hours or days may constitute such an injury. It is therefore considered that anthropogenic sound sources with the potential to induce TTS in a receiving marine mammal contain the potential for both (a) disturbance, and (b) injury to the animal.”

In Section 4 *Piling Mitigation Methodology* it is explained that the underwater noise modelling already undertaken will be supplemented or replaced by additional noise modelling. The section states: “as the Proposed Development continues to obtain further data on ground conditions within the array area and this feeds into more detailed ground models, the pile drivability understanding will continue to develop. As such, prior to construction, additional noise modelling will be undertaken based on the further developed understanding of ground conditions at that point and a piling scenario developed on that understanding. This MMMP, being intended as a live document will therefore be updated following the new noise modelling, with the final mitigation measures required for the Proposed Development identified within the final MMMP.



Therefore, at this point in time, the following mitigation measures have been identified as potential options which may be implemented within the final MMMP to seek to minimise the risk of any auditory injury to marine mammals from underwater noise during pile driving:

- *Marine mammal observation;*
- *Passive acoustic monitoring;*
- *Pre-piling deployment of acoustic deterrent devices (ADD);*
- *Soft-start procedure; and*
- *Noise abatement."*

The IWDG notes that this postponed decision-making on mitigation for underwater noise is not mentioned in the Design flexibility opinion granted by ABP on 26 January 2024 (see Appendix 2.4 *Design flexibility opinion*). The applicant therefore appears to discount their own underwater noise modelling conducted to date, and intends to conduct the whole exercise again with different parameters at a later date without the oversight of the Competent Authority.

The MMMP brings forward the results from the *Underwater Noise Modelling Report* (Appendix 14.1) and notes that the unmitigated piling would result in *"predicted impact ranges for minke whale and harbour porpoise (which) are greater than the distance which can be mitigated for with embedded measures; therefore, use of ADDs or noise abatement would be required to encourage individuals to leave the impact range or to limit the extent of the impact."*

There follows a discussion on the mitigation zone (ADDs or noise abatement found to be necessary to maintain the required 1000m zone); a run through the standard pre-piling search procedure; an assumption that the use of PAM will allow 24 operations (which is specifically precluded under DAHG (2014) guidance); a detailed protocol around the use of ADDs based on UK practice (JNCC, 2010), again ignoring



that these practices are not permitted in Ireland under current guidance; and a description of industry standard soft-starting techniques.

Geophysical surveys are also discussed, the 1000m mitigation zone defined in the DAHG (2014) guidance for sub-bottom profilers (SBP) is reduced to a less precautionary 500m, and starting geophysical works at night will be enabled by the use of PAM, which again is specifically precluded by the DAHG (2014) guidance.

The UXO (unexploded ordinance) mitigation methodology section correctly identifies that this topic is not specifically considered in the Irish guidance and proposes a number of sensible measures such as removal or deflagration before higher order detonations would be considered. The use of MMOs, ADDs and noise abatement in combination is supported by the IWDG in this case.

While the IWDG welcomes the consideration of noise abatement as a mitigation measure during piling operations, and considers that this approach should be developed further, we are alarmed at the lack of a defined and cohesive overall plan for mitigation. The Irish underwater noise guidance (DAHG, 2014) is currently under review leaving the developers in a difficult position in relation to their mitigation plans for underwater noise. Nevertheless the EIAR and supporting documents treat this most important topic in a haphazard and piecemeal fashion. In summary, the IWDG is greatly concerned that:

- Modelling results predict zones of potential injury to marine mammals way in excess of mitigation methods suggested in the EIAR;
- TTS is ignored as an injury to marine mammals, contrary to the current Irish guidance and against best practise in other European jurisdictions;
- Irish guidance on underwater noise is ignored in relation to 24-hour piling operations and use of PAM and ADDs;
- The approach to mitigation during geophysical surveys is incorrect;



- That the Irish guidance is under review is not acknowledged; and
- The MMMP is treated as a “live document” under review, thereby removing this crucial element of the EIAR from consideration by ABP and other consultees as part of the assessment process.

General discussion

Alternative mitigation strategies

Strategies applied internationally to protect receptors in the marine environment from the effects of excessive noise during piling for windfarm construction fall into two categories, which can be termed “source and threshold” and “receiver and exposure” (DOC, 2016). The source and threshold approach requires the expected sound levels from a piling event to be characterised in relation to the expected biological receptors, and the regulator then sets safe noise thresholds which cannot be exceeded. It is then the responsibility of the windfarm developer to apply any noise abatement technology necessary to ensure compliance, and sound outputs of the piling events are measured in real time to verify. Technical measures to achieve sufficient noise abatement take the form of acoustic barriers placed around the noise source: bubble curtains, solid barriers, “blue piling” and the IHC Noise Mitigation System are examples (Bellman, 2014; Dähne et al., 2017; Koschinski & Lüdemann, 2020). It has the added advantage of built-in protection for other marine organisms which are vulnerable to underwater noise, in particular fish, and their eggs and larvae (Popper et al, 2014).

This regime originated in Germany and has operated there since 2008 in line with the precautionary principle (Müller et al., 2019). Similar regulations now apply in Belgium (Belgische Staat, 2012), Denmark (DEA, 2022) and the Netherlands (TNO, 2011). The United States also applies range-specific thresholds for noise based on injury levels for cetaceans (NOAA, 2018), this is done in conjunction with elements of the receiver and exposure methods and could be considered even more precautionary.



Merchant (2019) reviewed noise abatement technologies and the regulatory structures driving their advancement, concluding *"The German approach has substantially reduced noise pollution from pile driving while allowing renewable energy developments to proceed, and therefore represents the most effective noise management model currently available. Further reduction of noise pollution beyond the current noise limit could also be achieved by progressively reducing the limit or by incentivising quieter operations."* See Figure 1 below as an example. In a report for the German regulator Bundesamt für Seeschifffahrt und Hydrographie (BSH), it was noted that based on area, the typical application of the regulations reduces sound exposure levels at 750m from source by 20dB, reducing the impact area by 99% (Müller et al., 2019).

The second category of mitigation does not attempt noise abatement, allowing the full sound energy from the piling event to propagate into the marine environment. The receiver and exposure method instead attempts to ensure that marine mammals are not subjected to injurious levels of sound energy by determining their absence prior to a piling event. A number of methods can be employed to achieve this. Marine Mammal Observers (MMOs) may visually scan the pre-determined mitigation zone to check for surfacing cetaceans. Passive Acoustic Monitoring (PAM) uses hydrophones to detect the presence of vocalising animals acoustically. Acoustic Deterrent Devices (ADDs) emit noise at pre-determined levels and frequencies which are designed to harass animals cause them to flee the area. Any combination of these methods may be applied and ADDs may in certain circumstances be used in conjunction with the source and threshold method. The UK (JNCC, 2017) and Ireland (DAHG, 2014) are examples.

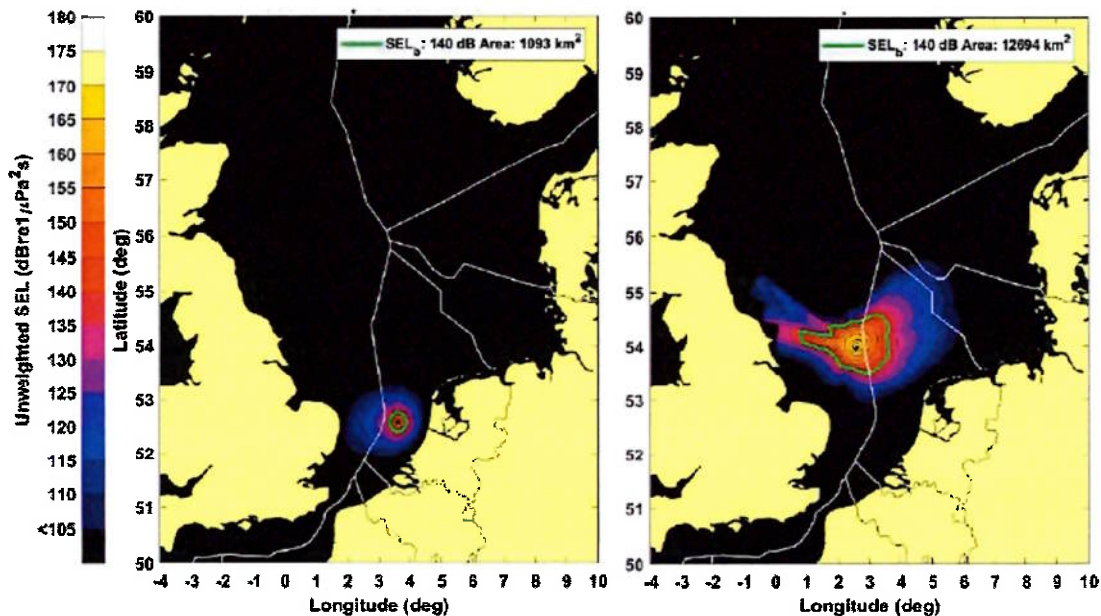


Figure 1: Examples of sound maps (right: Hollandse Kust (West II) and left: Hornsea Project Three) with contours in green for the sound levels at which the limit value of 140 dB re 1 $\mu\text{Pa}^2\text{s}$ for disturbance of harbour porpoises is exceeded. Mitigation of piling sound (left panel; noise limit $\text{SEL}_{\text{ss}}(750 \text{ m}) = 168 \text{ dB re } 1\mu\text{Pa}^2\text{s}$) results in a much smaller disturbance area than unmitigated piling (right panel). The asymmetric shape of the disturbance area in the right panel is caused by the bathymetry. Taken from De Jong et al. (2019), reproduced from Sinclair et al. (2023)

Acoustic deterrent devices

The use of ADDs to deter cetaceans so that they will leave the area around a piling operation prior to ramp-up, thus preventing them from receiving higher levels of sound energy, shows promise, and is part of the mitigation toolbox in many windfarm piling campaigns. In a Danish trial ADDs have been shown to deter all but 1% of porpoises within 1.9km, around half avoided the device between 2.1km and 2.4km, with no detectable effect beyond 2.6km (Brandt et al., 2013). Graham et al. (2023) noted greater behavioural response of porpoises to piling operations which



incorporated ADDS. In trials in Icelandic waters, minke whales exhibited a reliable avoidance response when exposed to ADD noise at 500m and 1000m (McGarry et al., 2017).

The available information to support the use of ADDs for mitigation during piling was collated in McGarry et al. (2022). The efficacy of ADDs for deterring harbour porpoises was supported to varying degrees across multiple studies and devices. There was a marked lack of peer-reviewed evidence for the ability of ADDs to deter baleen whales, other than McGarry et al (2017) cited above. Most studies on the response of dolphin species were based on deterrence from fishing gear rather than piling events, with a spectrum of responses recorded for different devices ranging from ineffective to effective.

The lack of a strong evidence base for the efficacy of ADDs in the case of the expected marine mammal species is worrying. The results from McGarry et al. (2017) were impressive for minke whales but is a single study of one species in Iceland; and should not be extrapolated to all baleen whales in the Irish case. Many studies show strong avoidance by harbour porpoise, but not necessarily at sufficient range to guarantee exclusion from the TTS zone as modelled. The lack of windfarm-specific knowledge about the likely response of dolphin species to ADDs is also concerning. Balancing the levels and frequencies of noise from ADDs also presents a challenge, as ensonifying large areas of habitat may have negative effects on cetaceans in addition to the dangers of piling.

Legislative framework and the MSFD

The 1992 EC Habitats Directive as transposed by the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) requires that all cetaceans occurring in Ireland are maintained at favourable conservation status. Under Article 12 of the Directive, all cetaceans should receive strict protection within the Exclusive Economic Zone. Under Article 4 of the Directive, Special Areas of Conservation (SACs) must be proposed for bottlenose dolphin and harbour



porpoise. Under the Wildlife Acts 1976 to 2018, all cetaceans and seals are protected species listed on the 5th Schedule, any person who injures a protected wild animal... shall be guilty of an offence, and they are protected from “*wilful interference*”. Under the Whale Fisheries Act 1937 the hunting of all whales, dolphins and porpoises is banned out to the 200nm limit. Ireland also has legal obligations to protect cetaceans and other marine megafauna and their habitats under the Convention on the Conservation of Migratory Species (Bern Convention), the Convention on the Conservation of European Wildlife and Natural Habitats (Bonn Convention) and the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention). Irish waters were declared a whale and dolphin sanctuary in 1991.

The update of Ireland’s Marine Strategy: Assessment (Article 8), Determination of Good Environmental Status (GES) (Article 9) and Environmental Targets (Article 10) as part of the EU Marine Strategy Framework Directive (MSFD) is currently in draft. It acknowledges the potential for both continuous and impulsive noise to cause behavioural disturbance and injury to marine animals and states that under the MSFD, to achieve good environmental status (GES) impulsive noise and continuous noise must not exceed levels that adversely affect populations of marine animals.

MSFD noise thresholds

In 2022, threshold values for the spatial and temporal extent of underwater noise were agreed at an EU level. D11C1 Impulsive noise thresholds are stated as “*For short-term exposure (1 day, i.e., daily exposure), the maximum proportion of an assessment/habitat area utilised by a species of interest that is accepted to be exposed to impulsive noise levels higher than the Level of Onset of Biologically adverse Effects (LOBE), over 1 day, is 20 % or lower ($\leq 20\%$). For long-term exposure (1 year), the average exposure is calculated. The maximum proportion of an assessment/habitat area utilised by a species of interest that is accepted to be exposed to impulsive noise levels higher than LOBE, over 1 year on average, is 10 % or lower ($\leq 10\%$)*”. For D11C2 Continuous noise the threshold established is “*20 % of the*



target species habitat having noise levels above LOBE not to be exceeded in any month of the assessment year, in agreement with the conservation objective of the 80 % of the carrying capacity/habitat size”.

An assessment of the status of underwater noise in Irish waters was carried out and is referenced in the Marine Strategy update documents. This analysis indicated that underwater noise data for Ireland was below the threshold values for the years assessed, and therefore that GES has been achieved in Irish waters where underwater noise is concerned.

For impulsive noise bottlenose dolphin (*Tursiops truncatus*) were chosen as a representative species and a value for the Level of Onset of Biologically Significant Effects (LOBE) of 176dB defined. The OSPAR impulsive noise registry was interrogated to quantify the number of “bang days”, which in this case represented seismic surveys. For each of the years assessed (2015 – 2020) areas were found to exceed the defined LOBE, but the maximum % area above LOBE did not exceed the 20% area threshold and GES was achieved. In the case of continuous noise harbour porpoise (*Phocoena phocoena*) were chosen as the indicator species and vessel noise identified as the main source of anthropogenic continuous noise; levels as modelled according to Le Courtois et al. (2016) were also found to be within the bounds of GES. The IWDG notes that the assessment was at a coarse scale and very narrow in its scope. These as-modelled results were based on very restricted inputs and no empirical data from acoustic monitoring.

Underwater noise research in Ireland

Ireland’s obligations under the MSFD and Habitats Directive and the development of ORE are driving increasing scrutiny of the issues around underwater noise, notably an SEAI-funded project entitled *Underwater noise monitoring baseline assessment for the roll-out of offshore renewable energy* (SEAI, 2024). The project seeks the establishment of a national acoustic baseline including a dedicated monitoring programme consisting of short-, medium- and long-term hydrophone deployments



and high-resolution predictive modelling. The text of the SEAI call states: *"Existing and evolving regulatory and permitting requirements mandate that URN levels be measured, and effectively managed, where necessary through avoidance or mitigation. A comprehensive framework and accompanying systematic acoustic monitoring programme are essential to ensure that the full potential of renewable offshore power can be realised sustainably, i.e. by minimising the risks posed by the deleterious effects of URN that can negatively impact on sensitive marine ecosystems and species"* (SEAI, 2024).

It is expected that this project will produce focused and relevant empirical data at appropriate scales which, when allied with up-to-date predictive modelling, will greatly improve our understanding of the anthropophony in Irish waters. While this is an entirely desirable outcome which will build on the assessment thus far undertaken under the MSFD, and add to our knowledge of underwater acoustics, it will put considerable onus on the consenting process, on regulators, and on windfarm developers to ensure that excess noise does not pollute the marine environment during windfarm construction.

Merchant et al. (2022) reviewed underwater noise research in support of MSFD noting the need to define threshold values for populations of marine animals, the lack of data to parameterise models exploring the population-level effects of noise exposure, and the need identified at European level to reduce underwater noise pollution (European Commission, 2021). The paper concluded that there is now a growing recognition that implementing quieting measures may be a prudent response to the mounting evidence of detrimental effects on individual animals.

Irish underwater noise guidance review

The receiver and exposure method is the one recommended in the Irish Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters (DAHG, 2014) which is taken as the mitigation approach in this EIAR. This guidance document, which in the opinion of the IWDG is badly out-of-date, is currently under



review by the Department of Housing, Local Government and Heritage (DHLGH). The 2014 guidance document, and its previous version (DAHG, 2007) is based on the approach taken in UK waters, as currently outlined in JNCC guidelines for minimising the risk of injury to marine mammals from geophysical surveys (seismic survey guidelines) (JNCC, 2017), and Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise (JNCC, 2010). It is interesting to note that the Joint Nature Conservancy Council (JNCC) have recently contracted consultants (both Seiche and RPS) to determine the feasibility of noise abatement methods during piling operations in UK waters, and a study carried out for Nature Scot found that some noise abatement systems have the potential to reduce underwater noise at future Scottish offshore wind sites, thereby reducing impacts on marine mammals and fish (Verfuss et al., 2019). The same study noted that many of the systems reviewed had not been proven in waters deeper than 40m or for piles greater than 8m diameter.

The relative merits of the source and threshold approach in comparison to the receiver and exposure methods are currently the subject of research and investigation in Ireland. The GOMOREUS project at MaREI (UCC) sets out *"to deliver a set of harmonised and unified evidence-based guidance, based on European best practice for the management of underwater noise to ensure ORE development in Ireland is compliant with EU legal obligations for the management of underwater noise"* (MaREI, 2024). This is being done in parallel with work on the UNGORE project being carried out by Bluewise Marine, the goal of which *"is to provide guidance to ORE developers on monitoring and reporting of UAN, as well as reviewing thresholds for noise generated in the different phases of ORE developments. This study will also identify possible strategies or techniques to mitigate effects of that UAN on marine life"* (Bluewise, 2024). Both of these projects are funded under the Marine Institute's Research for Policy Awards 2023 and deliverables are expected to be submitted to DHLGH later this year.



It is expected that DHLGH will, following review of these outputs and consultation with relevant parties, produce new guidance documents which will inform ORE developers, the relevant agencies (ABP, MARA, NPWS) and Government departments of their obligations. The new guidance will outline the regulatory framework and necessary technical measures applicable to protect the marine environment from underwater noise during the development of ORE in Irish waters.

Conclusion

The IWDG calls on the applicants Statkraft Ireland Ltd and Copenhagen Infrastructure Partners P/S to reformulate their marine mammal mitigation strategy, to include TTS as an injury to cetaceans in their assessment, and to adopt noise abatement technology in line with European standards. This will greatly reduce noise levels during piling operations, with reductions of 20dB possible using combined methods (Bellman et al., 2020), thereby reducing by orders of magnitude the area within which marine mammals could be injured or disturbed (Müller et al., 2019). This mitigation regime, used in conjunction with monitoring of the area prior to piling by visual (MMO) and acoustic (PAM) methods, and potentially incorporating ADDs to encourage marine mammals to flee at the appropriate time, represents the most appropriate suite of available mitigation systems. This combination of *"source and threshold"* and *"receiver and exposure"* methods is technically feasible and highly effective in preventing injury to legally protected marine mammals. By adopting it as the standard set of procedures during windfarm construction piling in Irish waters, both regulators and ORE developers can be confident of maintaining good environmental status and of greatly reducing the risk of breaches of environmental legislation.

Yours faithfully

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