

National Infrastructure Planning
Temple Quay House
2 The Square
Bristol,
BS1 6PN

By Email: NorfolkBoreas@planninginspectorate.gov.uk

PINS Reference: EN010087

Our Reference: 20022913

6th December 2019

Dear Sir/ Madam,

WDC comments on Norfolk Boreas Offshore Wind Farm

WDC have been engaging with the UK and devolved government bodies and developers for several years regarding marine renewable energy and providing advice regarding marine renewable developments and their potential impacts on whales, dolphins and porpoises (cetaceans). WDC is commenting on issues relating to cetaceans only.

Due to the impacts of climate change on cetaceans¹, WDC supports the development of well-considered marine renewable energy. However, we have serious concerns about the potential impacts these developments; both individually and cumulatively, have on cetaceans. These concerns are detailed in our report "*Marine Renewable Energy: A Global Review of the Extent of Marine Renewable Energy Developments, the Developing Technologies and Possible Conservation Implications for Cetaceans*" available at <https://uk.whales.org/wp-content/uploads/sites/6/2018/08/wdc-marine-renewable-energy-report.pdf>

WDC welcome the opportunity to comment on the proposed Norfolk Boreas offshore wind farm development. We have been engaged in discussions with the Applicant through the Marine Mammal Expert Topic Group (ETG). Through the ETG it was agreed that the Applicant would undertake an additional assessment of the impact of Norfolk Boreas on estimated number of harbour porpoise (*Phocoena phocoena*) that the Southern North Sea SAC site could support; we are pleased to see the inclusion of this assessment in Appendix 12.4 Additional Assessment in relation to the Southern North Sea Special Area of Conservation (SAC).

Our primary concern surrounds the intense noise pollution resulting from pile driving for all cetacean species in the region, and the impacts on the harbour porpoise population supported by the Southern North Sea Site of Special Area of Conservation (SAC). We are concerned that despite the lack of scientific evidence, there is reliance on embedded mitigation methods and an assumption that these mitigation methods will ensure no Adverse Effect on Integrity (AEoI) on the SNS SAC harbour porpoise population.

The Applicant has used an appropriate methodology to assess the impacts of pile driving on harbour porpoises. However when possible this has taken into account the embedded mitigation when assessing the potential magnitude of each

¹ WDCS and WWF. 2007. Whales in Hot Water. The Impact of a Changing Climate on Whales, Dolphins and Porpoises: A Call for Action. Available at https://uk.whales.org/wp-content/uploads/sites/6/2018/08/whales_hot_water.pdf

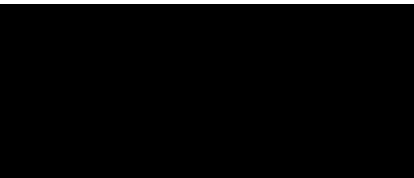
effect. WDC do not agree with this approach as these embedded mitigation measures are unproven, and this approach will lead to inaccurate and misleading results. Additionally the Applicant has concluded that through the Marine Mammal Mitigation Protocol (MMMP) for piling, MMMP for UXO and Site Integrity Plan (SIP), impacts will be reduced to within acceptable limits. WDC strongly disagree with this as these documents will be designed closer to construction, at which time the mitigation methods will be decided upon. Currently these plans are little more than a commitment to use mitigation methods, until the details of the plans are decided it is erroneous to conclude that these plans will ensure that impacts from Norfolk Boreas can be mitigated.

The details of our concerns for Norfolk Boreas Offshore Wind Farm development are detailed in Annex 1. Should consent be granted, our key recommendations for this development are (our full list of recommendations is detailed in Annex 1):

- That pile driving is not used at all during construction;
- If our recommendation of no pile driving is disregarded, that strict limits be placed on noise levels during construction, including cumulative noise;
- Only proven mitigation methods (such as a bubble curtain) are in place around the source to mitigate the impacts of radiated noise levels;
- That WDC is included as a consultee on the design of the MMMPs and SIP;
- That the monitoring strategy is appropriate to consider cumulative impacts of all developments in the region;
- Ground-truthing of modelled noise assessment data should be undertaken;
- An assessment report is publicly available within a reasonable timeframe of construction completion.

We are happy to meet to discuss any of these issues further.

Yours faithfully,



Vicki James.
Policy Officer.

Annex 1

General Comments

We recognise that the conclusions drawn are a 'worst case scenario' when assessing the impact on marine mammals, and believe this to be appropriate given the considerable unknowns surrounding the development of the wind farm. But, as they are deemed realistic, they should be treated accordingly. However, the worst case scenarios are based on impacts of pile driving; if alternative foundations are used there will be significantly different impacts on the environment.

Location of Boreas Offshore Wind Farm

Norfolk Boreas offshore windfarm lies directly within the SNS SAC, in the summer area, and adjacent to the summer and winter habitat for harbour porpoises with Norfolk Boreas overlapping the year round area (JNCC, 2017, 2016). Our

concern is that the windfarm construction will impact the SAC both alone and in-combination, with the potential to impact the harbour porpoise population of the site year-round.

As an SAC the Southern North Sea is a strictly protected site, designated under the EC Habitats Directive, with a specific Conservation Objective of “*To avoid deterioration of the habitats of the harbour porpoise or significant disturbance to the harbour porpoise, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to maintaining Favourable Conservation Status for the UK harbour porpoise.*” (JNCC, 2017).

Developing this area is of particular concern to WDC as the noise generated during construction, from pile driving in particular, has the potential to displace cetaceans and particularly harbour porpoises from the site. Studies on the impacts of pile driving suggest that harbour porpoises did not later return to their usual numbers (Brandt et al., 2011; Carstensen et al., 2006; Teilmann and Carstensen, 2012), and it is not clear if the animals are returning to the area, or using it in the same way.

The applicant should take into account the draft Conservation Objectives provided in the SAC consultation documents - that the site integrity must be maintained and there is no adverse impact on the population of harbour porpoise at the site. Site based protection cannot be met by assessing the whole North Sea population, but only by assessing the impacts for the number of individuals that are supported by the site (Rees et al., 2013)).

European Protected Species (EPS)

We recognise the timeframe within which the industry is required to build in order to meet targets, however, the requirement to understand and mitigate impacts to ensure strict protection of European Protected Species (EPS), including all cetacean species, remains. If pile driving is conducted, an EPS licence will be required.

Baseline survey methodology

WDC recognise that a number of site surveys have been undertaken to understand the use of the area by marine mammals, and provide a baseline upon which to assess the impacts of the development. WDC is pleased to see that two years of site surveys have been undertaken to understand the use of the area by marine mammals, and provide a baseline upon which to assess the impacts of the development. WDC believe that two years is the absolute minimum survey required to provide a reliable baseline data.

Aerial Surveys

WDC agrees that high definition aerial surveys are suitable for surveying for marine mammals, and are pleased to see that the methodology used is suitable for collecting marine mammal data.

Our only concern regarding the aerial surveys is that only a buffer of 4 km around Norfolk Boreas was used when undertaking the surveys, we feel this is inadequate to assess the numbers of marine mammals that could be impacted by the development, given the distances at which construction noises can disturb porpoises, these distances are highlighted in the ‘potential impacts’ section below.

Additionally we are pleased to see that all images were analysed, the methodology used and that marine mammals were identified to species level where possible as analysing the complete is only way to provide a reliable baseline for the assessment.

Additional data sources on marine mammals

WDC are pleased to see the inclusion of other data sources detailed in section 12.5.2. Chapter 12 Norfolk Boreas Offshore Wind Farm Environmental Statement, particularly the use of the aerial surveys for the former East Anglia Zone. The data from these surveys are useful for providing reliable baseline for Norfolk Boreas and surrounding area, however the surveys were completed in 2011, and we are concerned that there is a significantly large gap of seven years where no recent data outside the 4km buffer of the recent aerial surveys has been collected.

We are also concerned that the other datasets are not recent, are ad-hoc data and that are not dedicated marine mammal surveys and some only cover small parts of the Norfolk Boreas area, if at all. Whilst useful information they cannot be relied upon to provide a reliable baseline or plug gaps in knowledge.

We are pleased to see that SCANS data, including the recent SCANS III data has been included to assist with assessing marine mammal populations, and potential impacts on marine mammals. However, the SCANS surveys are only one seasonal snapshot in time, with a 10 year gap between datasets. It is not therefore appropriate to be used for estimates of density and finer-scale information is required where such data are not available (Green et al., 2012).

Data from East Anglia ONE surveys has been included; we are concerned by the use of this data as the methodology that was used for the boat-based surveys was designed for ornithology surveys, not for marine mammals. Marine mammal surveys that are developed as an add-on to boat-based bird surveys are inadequately designed monitoring programmes that cannot provide a sufficient baseline to characterise the environment. Harbour porpoise can potentially spend a significant amount of time underwater asleep, in periods of up to 24 minutes (Wright et al., 2017). These dives are often devoid of any vocalisation, and therefore are undetectable to passive acoustic monitoring (PAM), resulting in any environmental impact assessment underestimating the potential impacts on cetaceans (Wright et al., 2017).

Potential impacts

Pile Driving

WDC note that the foundation type has yet to be finalised, and are pleased to see that various foundation types are being considered for Norfolk Boreas. However, we are concerned to see that foundations requiring piling are included; there needs to be a move away from foundations requiring pile driving to reduce noise pollution in the marine environment. Pile driving, even with the use of pin piles, has the potential to cause physical harm, as well as displacement, particularly to harbour porpoises. We strongly recommend that monopile, or pin pile, foundations are not used due to the noise levels generated by pile driving and the location of Norfolk Boreas within the SNS SAC.

Noise levels during construction remain a key marine mammal concern due to pile driving of foundations. We recognise that worse case scenarios have been used when modelling the noise impact on marine mammals from pile driving and believe this to be appropriate given the considerable unknowns surrounding the development of the wind farm. However we would like to see consideration of the full range of potential impacts from other foundations being assessed as many will still involve piling activity and will have different potential impacts i.e. gravity foundations will create less noise, however they could have a much larger impact on the benthic fauna including sandeels, a main prey species for harbour porpoises and northern minke whales (*Balaenoptera acutorostrata*).

Reactions of harbour porpoises to the pile driving process have been recorded at distances many kilometres from the piling location (Brandt et al., 2018, 2011; Carstensen et al., 2006; Dähne et al., 2013; Thomsen et al., 2006). Research has shown the noise generated by the construction of offshore wind farms was loud enough to be audible by harbour porpoises beyond 80 km from the source and could mask communication at 30 – 40 km (Thomsen et al., 2006).

Bottlenose dolphins (*Tursiops truncatus*) could exhibit behavioural responses at distances of up to 40 km from pile driving locations (Bailey et al., 2010).

The research conducted so far has shown the potential for pile driving to cause behavioural changes in harbour porpoises which leave the area during construction and in some instances did not later return to their usual numbers (Brandt et al., 2011; Carstensen et al., 2006; Teilmann and Carstensen, 2012). Some studies have shown harbour porpoise start to return in one area, yet years later have not returned to other areas (Snyder and Kaiser, 2009). The longest running study into the effects of windfarms on harbour porpoises shows that ten years later, the population has only recovered to 29% of the baseline level (Teilmann and Carstensen, 2012). Even where areas have been recolonised, it is not clear if these are the same animals returning or new animals moving into the area, or if the animals are using the area in the same way.

Currently there are limited studies to demonstrate the potential impacts of pile driving on other cetacean species; however minke whales are vulnerable to the impacts of intense noise pollution. There was a significant decrease in northern minke whale sightings rates in western Scotland during periods of naval exercises (Parsons et al., 2000). From recordings taken during pile driving in the Moray Firth, (Bailey et al., 2010) suggested that northern minke whales, and other mid- and low-frequency hearing cetaceans, may exhibit behavioural disturbance up to 50 km away from the source.

We note that the maximum construction period would be 18 months for a single phase or 9 months per phase for two phase option with the potential of the two phases being conducted consecutively, with the potential of two vessels piling at one time in either scenario. This means the worst-case scenario could be 18 months of piling activity. Whilst we recognise that there will potentially be breaks in piling activity due to weather, between phases etc., this is a realistic worst-case scenario and therefore the impacts of this should be considered as such.

Harbour porpoises would be excluded from the site for the duration of the pile-driving phase(s). The construction of Norfolk Boreas has the potential to have a very high impact on the harbour porpoise, in particular the population supported by the SNS SAC. Harbour porpoise are reported to live up to 23 years, but rarely live over 12 years of age. They reach sexual maturity at 3-4 years and calving occurs every 2 years; therefore the potential impact of pile-driving from either scenarios on the harbour porpoise population is high, and potentially affecting breeding and feeding activity.

Harbour porpoise use echolocation to detect their prey, and due to a high metabolism they need to feed continuously to meet energy needs, therefore they are highly sensitive to disturbance (Wisniewska et al., 2018b, 2016). Loud noises, such as pile driving, can cause harbour porpoise to be displaced (Dähne et al., 2013) from potential important feeding grounds. Additionally harbour porpoise can lose 4% of their body weight in just 24 hours from starvation (Kastelein, 2018). Prolonged disturbance and restricted access to feeding grounds has the potential to pose a risk to life for individuals and as a result an impact on the harbour porpoise population. Given the importance of the Norfolk Boreas area and the SNS SAC for harbour porpoise, most likely as prime foraging areas, displacement from the area could be very significant.

Although it is likely that pile driving activity will not be constant, the installation of monopile foundations has been found to have a profound negative effect on harbour porpoise acoustic activity up to 72 hours after pile driving activity (Brandt et al., 2011). It is unlikely that harbour porpoises will return to an area during these gaps, resulting in them most likely being excluded from the area for the entire duration of construction.

WDC note that there could be two vessels driving piles at any one time, and that pile-driving will start at one site, and then continue at another (which may be adjacent to the pile already being driven or in another area of the wind farm). We are concerned that the cumulative impact assessment does not include pile driving commencing at a second location, whilst the first is still being driven. The impact of the second pile driving location on cetaceans is highly dependent upon the location of the second pile-driving site which is likely to have a different potential area of impact to the first.

In addition, having a second pile-driving location will increase the noise levels generated and have a cumulative impact. We recommend that the same consideration is given to marine mammals when the second pile-driving occurs as is given to the first and that it is not assumed that animals have moved out of the area as pile driving has already commenced elsewhere.

WDC are pleased to see that National Oceanic and Atmospheric Administration (NOAA) guidance (National Marine Fisheries Service (NMFS), 2018) has been used to model underwater noise levels from the construction of Norfolk Boreas, we agree this is the most appropriate and reliable model currently available. Additionally we are pleased that alongside permanent threshold shift (PTS), temporary threshold shift (TTS) has been included as the impacts can be just as significant as those from PTS. Although the recovery time from TTS varies widely and is dependent on the length of exposure and the level of exposure (Kastelein et al., 2012; Lucke et al., 2009), with a potential construction window of 18 months, TTS could significantly impact harbour porpoise population (both stand-alone and cumulatively), in particular on feeding behaviour. Also multiple displacement (such as from multiple construction phases) can lead to higher stress levels and a potential for hearing impairment (Dähne et al., 2013; Forney et al., 2017) and impacts on survival and reproduction (Forney et al., 2017).

When assessing the magnitude of effects on the harbour porpoise population, we notice that the results take into account the embedded noise mitigation measures, and conclude that with the use of MMMP for piling, MMMP for UXO and the SIP, that the magnitude will be reduced to negligible. WDC strongly disagrees with this approach, particularly for the cumulative assessment which includes soft-start and ramp-up. Including unproven mitigation measures (see the mitigation measures section below) will result in inaccurate and misleading results which will under-represent the realistic impacts of the piling. As a result we cannot agree with conclusion of magnitude from disturbance from piling activities.

Due to the sensitivity of harbour porpoises to noise disturbance, the location of Norfolk Boreas within the SNS SAC and that alternative foundations are available that have significantly less noise impact, we strongly recommend that foundations requiring piling are removed as an option for Norfolk Boreas.

Prey availability

We have considerable concerns about prey impacts resulting from the development, particularly on sandeels, mackerel, whiting and sprat – all of which are major prey species for the harbour porpoise and are in the Norfolk Boreas area. Any development has the potential to change the prey availability and it is uncertain if marine mammals would be able to adapt to any changes. As harbour porpoise need to feed almost continuously (Wisniewska et al., 2018a, 2016), small changes to their ability to forage, and their prey availability has the potential to have a significant impact (Kastelein, 2018).

Operational noise

Whilst it is anticipated that operational noise levels will be much lower than construction noise, there are limited data available on operational noise impacts on marine mammals, so a long-term monitoring plan should incorporate operational noise impacts on cetaceans if the development goes ahead, that covers the life span of the development.

Vessel noise

WDC is concerned about the impacts of increased vessel activity throughout the life of the development, but particularly during construction and decommissioning. Increased vessel noise can interrupt harbour porpoise foraging behaviour and echolocation, which can lead to significantly fewer prey capture attempts (Wisniewska et al., 2018b). There is an increased risk of collision and disturbance to cetaceans from increased vessel activity (Dyndo et al., 2015; James, 2013).

Cumulative Impact Assessment

The purpose of the Cumulative Impact Assessment (CIA) is to try and assess the effects of the development on the population of cetaceans in the area; therefore all projects that have the potential to impact that population must be considered. WDC is pleased to note the applicant has included a number of offshore industries in this assessment (as detailed in 12.4.2 of Chapter 12 Marine Mammals and Appendix 12.3 Marine Mammal CIA Screening), and that activities, including those across boundaries with the potential to disturb the harbour porpoise SAC population have been included.

WDC are pleased to see that activities other than development of offshore wind farms have been considered; increased vessel activity during construction of Norfolk Boreas in particular, have not been included. We recommend that vessel activity is included in the in-combination assessment as increased vessel noise can interrupt harbour porpoise foraging behaviour and echolocation, which can lead to significantly fewer prey capture attempts (Wisniewska et al., 2018b). This has the potential to be a significant impact due to the potential duration of the construction period and the location of Norfolk Boreas in both summer and year round areas of the SNS SAC. Additionally we do not agree with the Applicant that harbour porpoises will be “*habituated to the presence of vessels and therefore be expected to be able to detect and avoid construction vessels*” as there is no evidence to base this assumption on, this should not be presumed particularly in the SNS SAC where harbour porpoises will be feeding and potentially breeding.

We are also concerned that the CIA does not consider the impact of pile driving at two locations during construction of Norfolk Boreas. Having a second pile-driving location will increase the noise levels generated in the area and have a cumulative impact, and the severity of the impact will depend on the location of the two piling locations.

WDC does not agree with the conclusion of the CIA that impacts will only be of minor significance for harbour porpoise, particularly as this conclusion is based on the use of embedded mitigation measures, and a Site Integrity Plan (SIP) for the SNS SAC. See SIP section below for comments on this plan. Additionally a robust monitoring programme should be a requirement of consent to ground-truth any assessment conclusions.

Mitigation methods

WDC notes that the JNCC guidance for minimising the risk of injury to marine mammals from piling noise (JNCC, 2010) have been detailed in the ES. We recognise that currently these are the only guidelines available to developers to use to minimise the impacts of piling activity on marine mammals, however it is widely known that these guidelines are outdated, and do not use the latest scientific evidence.

The in-situ methods in the JNCC guidelines have been widely criticised as arbitrary and with a lack of supportive evidence (Wright and Cosentino, 2015). Additionally the guidelines have not been updated for a number of years and

therefore do not include the latest and increasing body scientific data of the impacts of noise on marine mammals (Wright and Cosentino, 2015).

WDC, in particular, have concerns over the guidance that soft-starts should be used and the use of Marine Mammal Observers (MMOs). WDC do not consider 'soft-start' to be an adequate mitigation measure as they are only a reduction in sound source at the initiation of a piling event. It cannot be assumed that cetaceans will leave an area during a soft-start as they may remain the area due to prey availability or breeding despite the harmful noise levels (Faulkner et al., 2018). Whilst a common sense measure, soft-starts are not a proven mitigation technique and so cannot be relied upon to mitigate impacts, especially for developments in close proximity to important and critical habitat areas.

We also have serious concerns regarding the JNCC protocol for using marine mammal observers (MMOs) and PAM operators to ensure that no marine mammals are within 500m of a pile driving site before commencing pile-driving. The use of MMOs and passive acoustic monitoring (PAM) to detect animals is a monitoring measure, not a mitigation measure.

We are concerned that acoustic deterrent devices (ADDs) such as pingers may be used to move marine mammals out of the area. Not only will this add another source of noise into the environment (Faulkner et al., 2018), the use of ADDs has not been proven as a mitigation for pile driving and cannot be relied upon for the range of species likely to be encountered in the wind farm region. The range of displacement from ADDs has the potential to exceed the range of displacement from pile driving itself when using bubble curtains (Dähne et al., 2017). Furthermore, the short and long-term impacts of ADDs on marine mammals need to be thoroughly considered.

Our concerns with the SNCB guidance on noise management within mobile species marine protected areas (MPAs), and our views and recommendation are attached at the end of this document.

A number of mitigation methods to reduce noise from piling activities have been proven in demonstration scale trial studies (AdBm Corp, 2014; Diederichs et al., 2013; Wilke et al., 2012). Studies at full scale offshore wind farms have shown that the use of bubble curtains during pile driving activities can reduce the disturbance area on harbour porpoises from ~15 km to ~5 km compared to piling with no mitigation, totalling ~90% reduction in harbour porpoise disturbance area (Nehls et al., 2016).

Other studies have shown a smaller, but still significant reduction in noise levels and disturbance area, bubble curtains can reduce the range at which pile driving can be heard by harbour porpoises (Brandt et al., 2018) and may reduce temporary habitat loss and risk of hearing loss in harbour porpoises (Dähne et al., 2017). Harbour porpoise detections at 10-15 km from a piling location declined by around 50% without a bubble curtain, but with this mitigation in place there was only a 17% decline (Brandt et al., 2018). When this is extrapolated to the potential 180 piling locations for Norfolk Boreas, these mitigation methods could provide a significant reduction in the impact of piling on harbour porpoise in particular.

WDC strongly recommend that only mitigation methods that are proven should be considered.

Mitigation and the Southern North Sea SAC

Studies have shown that in areas of high site fidelity, traditional mitigation methods that attempt to minimise injury by moving animals out of an area as noise levels are gradually increased, can be counterproductive for small, localised

marine mammal populations for which displacement may cause harm. This is a particular concern in breeding and feeding areas (Forney et al., 2017).

A study analysing benefits of noise reduction to harbour porpoise during offshore wind construction found that if wind farms inside the Southern North Sea SAC reduced their noise levels by the equivalent of around 8dB, the risk of a 1% annual decline in the North Sea porpoise population can be reduced by up to 66% (WWF, 2016). As bubble curtains have the potential to reduce noise levels by 7dB (Brandt et al., 2018) using these proven mitigation methods is the only way to reduce the far reaching avoidance distances for cetaceans.

Whilst a 7dB noise reduction at 750 m may seem a limited area, this reduction could also be enough to change the noise levels from piling activities from 'lethal' down to 'disturbance levels'. This could be very important, especially when extrapolated for hundreds of piling events.

Marine Mammal Mitigation Protocol (MMMP)

WDC are pleased to see a commitment to a MMMP. We recognise that the MMMP will be designed closer to construction, once all details and plans are known, and that mitigation methods to be used will be decided at that time. We believe this to be appropriate as this enables the latest proven mitigation methods to be included in the MMMP.

However, until the details of the MMP are decided it is inaccurate to conclude that the MMMP will ensure that impacts are adequately mitigated. We are concerned that the MMMP currently only includes mitigation methods from the JNCC guidelines, and claims that this will mitigate any auditory or physical injury. WDC strongly disagrees with this conclusion, and would like to see a commitment to ensure that only proven mitigation methods are included in the MMMP.

Currently there is no modelling of noise mitigation methods. As methods such as bubble curtains show a potential significant reduction in the impacts of noise on harbour porpoise, it is recommend that modelling the effect of this technology is undertaken (Faulkner et al., 2018) in particular to assess cumulative impacts.

We recommend that the MMMP should include marine mammal observers (MMOs) and passive acoustic monitoring (PAM) used in conjunction at all times, and shut-down when marine mammals approach within a specified distance of operations (mitigation zone).

WDC request to be involved in the consultation of the MMMP to ensure that is sufficient as we have concerns regarding effectiveness of some mitigation methods.

Site Integrity Plan (SIP)

WDC welcome the inclusion of the Site Integrity Plan (SIP), and the opportunity to comment on it through the EWG. We appreciate the commitment Norfolk Boreas is making to the implementation of mitigation to ensure no Adverse Effect on Integrity (AEoI) on the SNS SAC during the construction of Norfolk Boreas offshore wind farm. We recognise that there is a lack of detail on the final project design, which makes it difficult to determine the type of mitigation required. However, there is still a large degree of uncertainty on if the use of the SIP can conclude no adverse effect on site integrity beyond scientific doubt.

We acknowledge that there is a lack of guidance from SNCBs on what to include in a SIP, however we are concerned that the SIP for Norfolk Boreas does not contain a commitment to proven mitigation methods or an assessment of the

effectiveness of proposed mitigation methods. Currently the SIP is little more than a commitment to use mitigation methods and therefore cannot remove all reasonable scientific doubt as to the effects of the project on the SNS SAC, therefore it cannot be relied upon to ensure no AEol and it is inaccurate to conclude that due to the SIP any impacts from Norfolk Boreas will result in negligible impacts on marine mammals.

WDC recommend that the SIP should include a commitment to using proven mitigation methods alongside modelling the effectiveness of proposed mitigation measures, supported with case studies on how these measures reduce noise disturbance on marine mammals. The SIP should also include a commitment to ground-truthing the effectiveness of these mitigation measures.

WDC request to be involved in the consultation of the SIP to ensure that is sufficient to ensure no AEol on the SNS SAC.

Habitats Regulations Assessment (HRA)

With Norfolk Boreas located within the SNS SAC, the wind farm construction will impact the SNS SAC both alone and in combination. Therefore there an assessment must be undertaken not only against the North Sea management unit, but also for the harbour porpoise population supported by the SNS SAC to ensure there is no Adverse Effect on Integrity (AEol) from the development.

One of our main concerns is that the assessment on the harbour porpoise population in the SNS SAC is not being based upon the population of the site, but against the North Sea Management Unit. The HRA must take into account the draft Conservation Objectives provided in the SNS consultation documents - that the site integrity must be maintained and there is no adverse impact on the population of harbour porpoise at the site (JNCC, 2016). Site based protection cannot be met by assessing the whole North Sea population, but only by assessing the impacts for the number of individuals that are supported by the site (Rees et al., 2013).

WDC acknowledges that the advice from the SNCB's, and within the SNS Site Selection Document, is "*because this estimate is from a one-month survey in a single year it cannot be considered as a specific population number for the site. It is therefore not appropriate to use site population estimates in any assessments of effects of plans or projects (i.e. Habitats regulation Assessments), as these need to take into consideration population estimates at the MU level, to account for daily and seasonal movements of the animals*" (JNCC, 2017). WDC strongly disagree with this advice, and have raised this issue previously. The European Commission guidance on managing Natura 2000 sites also states that the integrity of the site (habitat and species) must be maintained (European Commission and Office for Official Publications of the European Communities, 2000).

As agreed at the ETG, we are pleased to see the inclusion of Appendix 12.4 Additional Assessment in relation to the Southern North Sea Special Area of Conservation (SAC). Our comments on this assessment are below.

WDC cannot agree with the conclusion of the HRA that there will be no likely significant effect/ adverse effect from in combination. Although we are pleased to see commitment to mitigation measures, without saying which mitigation measures will be used we cannot agree with this conclusion. We acknowledge that Vattenfall are committed to using the latest mitigation measures and that these technologies changes as new technologies are likely to emerge closer to the construction window, however without knowing which methods will be used, or if these mitigation methods are proven it is misleading to conclude that there will be no likely significant effect/ adverse effect as there is no scientific evidence to back up this claim.

Whilst WDC agree with the list of potential effects considered in the Information for the Habitats Regulations Assessment, Document Reference: 5.3. We are concerned that embedded mitigation measures have been taken into account when assess the potential, magnitude of effect. We strongly disagree with this approach, as outlined in the Mitigation Measures section above these methods lack evidence to support their effectiveness and this approach will produce inaccurate and misleading results which will potentially underestimate the impacts of the activities on the harbour porpoise population and the SNS SAC.

It is also assumed that the MMMP for UXO, MMMP for piling and the SIP will mitigate the impacts. For reasons detailed in the relevant sections above, WDC strongly disagree with this approach. Until the mitigation measures are finalised, and only proven mitigation measures are used that can be effectively assessed to understand their effectiveness, it is inaccurate to conclude these plans can mitigate the impacts.

As the plans for Norfolk Boreas offshore wind farm are highly likely to affect conservation and management objectives of the SNS SAC for harbour porpoises, and due to the serious concerns outlined above, WDC strongly disagrees with the conclusions of the HRA.

Additional Assessment in relation to the Southern North Sea candidate Special Area of Conservation (cSAC)

WDC appreciate the time the Applicant has spent to conduct this assessment. We agree with the methodology undertaken and that the latest SCANS-III data has been used to estimate the number of harbour porpoises that could be supported by the site. We are pleased that the assessment has used the 'worst case scenario' when assessing the impact on marine mammals, and believe this to be appropriate however, as they are deemed realistic, they should be treated accordingly.

The results of the in-combination assessment are of particular concern. The results demonstrate the potential for large areas of the SNS SAC where harbour porpoises could be disturbed by piling activities, with very high percentages of the population being disturbed. This is a high percentage of the population that could be disturbed from feeding and potential breeding activity and has the potential to cause barrier to movements to access other areas of the SNS SAC.

We are concerned that the in-combination effects in particular are likely to cause AEol.

In-field impact monitoring

All in-field impact monitoring should be undertaken during construction and operation to ensure that the proposed population modelling impacts calculated in theory are accurate. Should any more negative impacts occur then the development should be halted and mitigation methods revisited. However we note that it is likely that any long-term negative impacts are unlikely to be documented during the timing of construction itself, unless these impacts are dramatic.

To fully understand the impacts of piling activities on cetaceans, in particular harbour porpoises and the SNS SAC, the monitoring should be robust enough to demonstrate the responses of harbour porpoise to piling activities. Monitoring should be undertaken throughout the construction period, and into the operational phase, across the Norfolk Boreas site to fully assess the impacts of piling. Additionally we would like to see the commitment to monitor piling to any foundations requiring pile driving, not just monopile foundations.

Decommissioning

We are pleased to see that at the moment there are no plans to use explosives during the decommissioning of the wind farm, and that instead decommissioning will most likely will involve cutting of piles and grinding or drilling techniques. We hope that this will continue to be the case when the detailed plan is drawn up because the use of explosives in decommissioning has the potential to cause physical harm or be lethal to cetaceans (Prior and McMath, 2008).

We do have concerns regarding the noise levels that may be generated by decommissioning, and recognise that this will be dependent on the methods used to remove the turbine foundations. Until the removal methods are decided the impacts of such activity remain unknown.

Full list of recommendations

Should consent be given to this proposed development, WDC strongly recommends the following consent conditions:

- That pile driving is not used at all during construction;
- If our recommendation of no pile driving is disregarded, that strict limits be placed on noise levels during construction, including cumulative noise;
- Only proven mitigation methods (such as a bubble curtain) are in place around the source to mitigate the impacts of radiated noise levels;
- That WDC is included as a consultee on the design of the MMMPs and SIP;
- That the monitoring strategy is appropriate to consider cumulative impacts of all developments in the region;
- Ground-truthing of modelled noise assessment data should be undertaken;
- An assessment report be publicly available within a reasonable timeframe of construction completion;
- Further assessments are made on alternative foundations to fully understand the potential impacts on marine mammals, and prey species;
- Visual and acoustic monitoring should be ongoing throughout construction;
- Activities should be halted when marine mammals approach within a specified distance of operations (mitigation zone);
- That the monitoring strategy is appropriate to consider cumulative impacts of developments within and adjacent to the SNS SAC;
- Collected data are made available to all stakeholders, and that acceptable levels of impact(s) are clearly identified through the Marine Mammal Monitoring Plan and that an adaptive approach is applied, where development is halted should significant impacts be observed.

References

- AdBm Corp, 2014. AdBm Demonstration at Butendiek Offshore Wind Farm with Ballast Nedam.
- Bailey, H., Senior, B., Simmons, D., Rusin, J., Picken, G., Thompson, P.M., 2010. Assessing underwater noise levels during pile-driving at an offshore windfarm and its potential effects on marine mammals. *Mar. Pollut. Bull.* 60, 888–897. <https://doi.org/10.1016/j.marpolbul.2010.01.003>
- Brandt, M., Diederichs, A., Betke, K., Nehls, G., 2011. Responses of harbour porpoises to pile driving at the Horns Rev II offshore wind farm in the Danish North Sea. *Mar. Ecol. Prog. Ser.* 421, 205–216. <https://doi.org/10.3354/meps08888>
- Brandt, M., Dragon, A., Diederichs, A., Bellmann, M., Wahl, V., Piper, W., Nabe-Nielsen, J., Nehls, G., 2018. Disturbance of harbour porpoises during construction of the first seven offshore wind farms in Germany. *Mar. Ecol. Prog. Ser.* 596, 213–232. <https://doi.org/10.3354/meps12560>

- Carstensen, J., Henriksen, O., Teilmann, J., 2006. Impacts of offshore wind farm construction on harbour porpoises: acoustic monitoring of echolocation activity using porpoise detectors (T-PODs). *Mar. Ecol. Prog. Ser.* 321, 295–308. <https://doi.org/10.3354/meps321295>
- Dähne, M., Gilles, A., Lucke, K., Peschko, V., Adler, S., Krügel, K., Sundermeyer, J., Siebert, U., 2013. Effects of pile-driving on harbour porpoises (*Phocoena phocoena*) at the first offshore wind farm in Germany. *Environ. Res. Lett.* 8, 025002. <https://doi.org/10.1088/1748-9326/8/2/025002>
- Dähne, M., Tougaard, J., Carstensen, J., Rose, A., Nabe-Nielsen, J., 2017. Bubble curtains attenuate noise from offshore wind farm construction and reduce temporary habitat loss for harbour porpoises. *Mar. Ecol. Prog. Ser.* 580, 221–237. <https://doi.org/10.3354/meps12257>
- Diederichs, A., Pehlke, H., Brandt, M., Bellmann, M., Oldeland, J., Nehls, G., 2013. Does a big bubble curtain during pile driving minimise negative effects on harbour porpoises? 27th Conf. Eur. Cetacean Soc. Abstr. Book 52.
- Dyndo, M., Wiśniewska, D.M., Rojano-Doñate, L., Madsen, P.T., 2015. Harbour porpoises react to low levels of high frequency vessel noise. *Sci. Rep.* 5. <https://doi.org/10.1038/srep11083>
- European Commission, Office for Official Publications of the European Communities (Eds.), 2000. Managing natura 2000 sites: the provisions of article 6 of the “Habitats” directive 92/43/EEC. Office for Official Publications of the European Communities, Luxembourg.
- Faulkner, R.C., Farcas, A., Merchant, N.D., 2018. Guiding principles for assessing the impact of underwater noise. *J. Appl. Ecol.* <https://doi.org/10.1111/1365-2664.13161>
- Forney, K., Southall, B., Slooten, E., Dawson, S., Read, A., Baird, R., Brownell, R., 2017. Nowhere to go: noise impact assessments for marine mammal populations with high site fidelity. *Endanger. Species Res.* 32, 391–413. <https://doi.org/10.3354/esr00820>
- Green, M., Caddell, R., Eisfeld, S., Dolman, S., Simmonds, M., 2012. Looking forward to ‘strict protection’: A critical review of the current legal regime for cetaceans in UK waters. A WDCS report.
- James, V., 2013. Marine renewable energy: a global review of the extent of marine renewable energy developments, the developing technologies and possible conservation implications for cetaceans. Whale and Dolphin Conservation.
- JNCC, 2017. SAC Selection Assessment: Southern North Sea.
- JNCC, 2016. Harbour Porpoise (*Phocoena phocoena*) possible Special Area of Conservation: Southern North Sea Draft Conservation Objectives and Advice on Activities 28.
- JNCC, 2010. Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise 14.
- Kastelein, R., 2018. Harbour porpoise (*Phocoena phocoena*) energetics and fish catch ability related to offshore pile driving. [WWW Document]. SMRU Consult. URL <http://www.smruconsulting.com/inpas-abstracts-announced/> (accessed 9.27.18).
- Kastelein, R.A., Gransier, R., Hoek, L., Olthuis, J., 2012. Temporary threshold shifts and recovery in a harbor porpoise (*Phocoena phocoena*) after octave-band noise at 4 kHz. *J. Acoust. Soc. Am.* 132, 3525–3537. <https://doi.org/10.1121/1.4757641>
- Lucke, K., Siebert, U., Lepper, P.A., Blanchet, M.-A., 2009. Temporary shift in masked hearing thresholds in a harbor porpoise (*Phocoena phocoena*) after exposure to seismic airgun stimuli. *J. Acoust. Soc. Am.* 125, 4060–4070. <https://doi.org/10.1121/1.3117443>
- National Marine Fisheries Service (NMFS), 2018. 2018 Revisions to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0). Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts. 178.
- Nehls, G., Rose, A., Diederichs, A., Bellmann, M., Pehlke, H., 2016. Noise Mitigation During Pile Driving Efficiently Reduces Disturbance of Marine Mammals, in: Popper, A.N., Hawkins, A. (Eds.), *The Effects of Noise on Aquatic Life II*. Springer New York, New York, NY, pp. 755–762. https://doi.org/10.1007/978-1-4939-2981-8_92

- Parsons, E.C.M., Birks, I., Evans, P.G.H., Gordon, J.C.D., Shrimpton, J.H., Pooley, S., 2000. The Possible Impacts of Military Activity on Cetaceans in West Scotland. *Eur. Res. Cetaceans* 185–191.
- Prior, A., McMath, M.J., 2008. Marine Mammals and Noise from Offshore Renewable Energy Projects – UK Developments. *Proc. ASCOBANS ECS Workshop Offshore Wind Farms Mar. Mamm. Impacts Methodol. Assess. Impacts San Sebastian Spain 21st April 2007 ECS special publication series no. 49. Feb 2008.*, 12–17.
- Rees, S.E., Sheehan, E.V., Jackson, E.L., Gall, S.C., Cousens, S.L., Solandt, J.-L., Boyer, M., Attrill, M.J., 2013. A legal and ecological perspective of ‘site integrity’ to inform policy development and management of Special Areas of Conservation in Europe. *Mar. Pollut. Bull.* 72, 14–21. <https://doi.org/10.1016/j.marpolbul.2013.03.036>
- Snyder, B., Kaiser, M., 2009. Ecological and economic cost-benefit analysis of offshore wind energy. *Renew. Energy* 1567–1578.
- Teilmann, J., Carstensen, J., 2012. Negative long term effects on harbour porpoises from a large scale offshore wind farm in the Baltic—evidence of slow recovery. *Environ. Res. Lett.* 7, 045101. <https://doi.org/10.1088/1748-9326/7/4/045101>
- Thomsen, F., Betke, K., Schultz-von Glahn, M., Piper, W., 2006. Noise During Offshore Wind Turbine construction and its effects on Harbour Porpoises (*Phocoena phocoena*). *Eur. Cetacean Soc. 20th Annu. Conf.*
- Wilke, F., Kloske, K., Bellmann, D.M., 2012. ESRa – Evaluation of Systems for Ramming Noise Mitigation at an Offshore Test Pile 168.
- Wisniewska, D.M., Johnson, M., Teilmann, J., Rojano-Doñate, L., Shearer, J., Sveegaard, S., Miller, L.A., Siebert, U., Madsen, P.T., 2018a. Response to “Resilience of harbor porpoises to anthropogenic disturbance: Must they really feed continuously?” *Mar. Mammal Sci.* 34, 265–270. <https://doi.org/10.1111/mms.12463>
- Wisniewska, D.M., Johnson, M., Teilmann, J., Rojano-Doñate, L., Shearer, J., Sveegaard, S., Miller, L.A., Siebert, U., Madsen, P.T., 2016. Ultra-High Foraging Rates of Harbor Porpoises Make Them Vulnerable to Anthropogenic Disturbance. *Curr. Biol.* 26, 1441–1446. <https://doi.org/10.1016/j.cub.2016.03.069>
- Wisniewska, D.M., Johnson, M., Teilmann, J., Siebert, U., Galatius, A., Dietz, R., Madsen, P.T., 2018b. High rates of vessel noise disrupt foraging in wild harbour porpoises (*Phocoena phocoena*). *Proc. R. Soc. B Biol. Sci.* 285, 20172314. <https://doi.org/10.1098/rspb.2017.2314>
- Wright, A.J., Akamatsu, T., Mouritsen, K.N., Sveegaard, S., Dietz, R., Teilmann, J., 2017. Silent porpoise: potential sleeping behaviour identified in wild harbour porpoises. *Anim. Behav.* 133, 211–222.
- Wright, A.J., Cosentino, A.M., 2015. JNCC guidelines for minimising the risk of injury and disturbance to marine mammals from seismic surveys: We can do better. *Mar. Pollut. Bull.* 100, 231–239. <https://doi.org/10.1016/j.marpolbul.2015.08.045>
- WWF, 2016. A Positive Future for Porpoises and Renewables. Assessing the Benefits of Noise Reduction to Harbour Porpoises During Offshore Wind Farm Construction.



The Wildlife Trusts, WWF, Whale and Dolphin Conservation and ClientEarth current views on underwater noise management within mobile species marine protected areas (MPAs)

October 2017

Summary

This document sets out:

- (i) Our views on the in the UK Interagency Marine Mammal Working Group's (IAMMWG) proposed area-based threshold approach to management of underwater noise in harbour porpoise candidate Special Areas of Conservation (cSACs) in the UK;
- (ii) an alternative underwater noise management model based on noise limits, which has been successfully implemented in a number of other European countries; and
- (iii) the need for a new UK policy on noise reduction at sea, based on an overall limit on noise throughout the UK, in order to protect this wide-ranging, highly mobile species.

The advantages of a management approach based on noise limits are that it: (i) is based on robust scientific evidence and methodology; (ii) incentivises the development and use of noise reduction technologies and methods; and (iii) enables more detailed planning and certainty at an earlier stage of the project.

Evidence-led noise management is required in order to meet the conservation objectives of these sites and ensure that measures are compliant with the requirements of Article 6 of the Habitats Directive to avoid: (i) disturbance of harbour porpoise, where such disturbance could be significant in relation to the objectives of the Directive; and (ii) adverse effects on these sites.

We recognise that assessing and managing the impact of underwater noise is in its infancy. Therefore, management should be reviewed and updated regularly based on new science and evidence. A multi-sector forum is required to oversee this.

We want to work with industry, regulators and SNCBs to develop underwater noise management measures that are proven to be effective, legally compliant and that can be used to provide certainty to all at the earliest stage of planning.

1. Introduction

After reviewing the area-based threshold approach¹ proposed by the UK Interagency Marine Mammal Working Group (IAMMWG) at its stakeholder workshop in February 2017, we have concluded that we cannot support this approach in its current form for the following reasons:

- The scientific evidence base underpinning this approach is not sound; bycatch cannot be related to disturbance

¹ A potential approach to assessing the significance of disturbance against conservation objectives of the harbour porpoise cSACs. Discussion document. Version 3.0. Distributed by JNCC for the noise management in harbour porpoise cSACs workshop 27th February 2017.

- Due to the lack of robust scientific evidence underpinning this approach, it would need to be much more precautionary in order to comply with the requirements of Article 6 of the Habitats Directive
- It provides weaker protection for the harbour porpoise than the approach taken by other European countries
- It does not encourage or incentivise noise reduction technologies and methods

Please see Appendix A for an in-depth narrative on the above points.

We advocate an alternative approach to underwater noise management based on noise limits, which has already been implemented by a number of other European countries. This is a tried and tested method which is supported by empirical evidence.

We also set out a number of other areas of work which are required to ultimately lead to noise reduction within UK seas - measures that are needed in order to achieve the strict protection required by the Habitats Directive for harbour porpoises throughout their range.

Much more discussion is required on the methods for managing and implementing underwater noise management and we would like to open the debate on this issue with industry, regulators and SNCBs.

We are requesting feedback on this document and are happy to discuss our thoughts in an open and productive way to progress the development of underwater noise management. Please contact Tania Davey, Living Seas Sustainable Development Officer at The Wildlife Trusts to provide feedback or to arrange a meeting to discuss our proposals:

Email: tdavey@wildlifetrusts.org

Office: 01507 528388



2. NGO noise management proposal

Below we propose noise management which would combine noise limits with a more precautionary area-based approach. In addition to this, noise limits should also be set at a wider seas level to achieve the protection required by the Habitats Directive for marine mammals across their natural range, as part of a wider noise reduction strategy. The proposal is focused, at present, on the management of noise from piling activity.

2.1. Assessing individual wind farm developments: noise limits

Precautionary noise limits must be set for harbour porpoise cSACs to ensure the conservation objectives of each site are achieved and requirements of the Habitats Directive are met.

Our proposed approach is simple and would introduce maximum noise limits, based on information within scientific literature, at a certain distance from impulsive noise activities in or within 26km of the harbour porpoise cSACs. The benefits of using noise limits are as follows:

2.1.1. It is a tried and tested method used in other European countries

Noise limits are currently already being used in Germany, Belgium and the Netherlands (see figure 1).

In Germany, noise limits have been used to manage underwater noise since 2013. From our understanding, regulators and developers work to meet noise levels by implementing the following:

- Noise modelling is used to predict noise levels from piling and to plan the mitigation needed to reduce noise levels to the agreed standard
- Test piling is undertaken to test predicted noise levels
- A programme of monitoring is undertaken to understand marine mammal abundance and distribution pre- consent, during construction and post construction
- A programme of monitoring to understand pre- construction ambient noise levels, construction noise levels of every pile until proof has been provided of continuous, reliable adherence to the noise prevention value and post construction measurements of waterborne operating noise.²

Further details on the way that Germany manages noise to protect harbour porpoises can be found in the '[German Sound Protection Concept](#)' document from the German authorities on this subject, available [here](#). We have had some dialogue with the German regulators. We recommend that UK regulators discuss the concept with the German regulators and we are happy to provide contact details.

German Sound Protection concept, requiring constant sound exposure levels (SEL) to be less than 160 dB re 1 μ Pa at 750m (single peaks up to 190 dB re 1 μ Pa at 750m) from the noise source within the German EEZ. No piling is allowed within harbour porpoise SACs and an adverse effect on a site is to be presumed if at 10% or more of the area of the site is located within the disturbance radius. [Nehls et al \(2016\)](#) shows, for example, that reaching the 160dB threshold at the German Borkum West II wind farm reduced the noise impact area by 90% while still allowing significant wind farm construction, which would significantly reduce the risk of a population-level decline.

Belgium noise management, requiring Peak Level 185 dB re 1 μ Pa at 750m Peak across EEZ as a measure under the Marine Strategy Framework Directive.

Netherlands noise management, which considers noise limits on a case by case basis in addition to seasonal restrictions on construction. For example, the Borsselle wind farm had a Sound Exposure Level (SEL) limits of 160-172 dB re μ Pa² at 750m from the source as a function of the number of turbines and time of year of construction

Figure 1: European examples of implemented noise limits

2.1.2. It meets the requirements of the Habitats Directive

Management measures introduced for harbour porpoise cSACs must ensure that each site's conservation objectives are met. The overall conservation objective for all sites is to ensure that the integrity of the site is maintained and that it makes an appropriate contribution to maintaining Favourable Conservation Status (FCS) for harbour porpoise in UK waters. More specifically, Conservation Objective One specifies as follows: 'Harbour porpoise is a viable component of the site', while Conservation Objective Two specifies that: 'There is no significant disturbance of the species'.

² Investigation of the Impacts of Offshore Wind Turbines on the Marine Environment (StUK4). 2013. Bundesamt für Seeschifffahrt und Hydrographie, BSH

Information from scientific literature is available on appropriate noise thresholds for harbour porpoise for Permanent Threshold Shift (PTS), Temporary Threshold Shift (TTS)³⁴ and disturbance⁵. Exceeding noise thresholds has the potential to cause death, injury and disturbance. If these noise limits are exceeded therefore, this is likely to result in the non-achievement of the conservation objectives for these sites, resulting in negative impacts on the Favourable Conservation Status of harbour porpoise, in breach of the Habitats Directive. We do not currently know enough about the functioning and population levels of harbour porpoise within these particular cSACs. Therefore, the limits set out in this scientific literature should be used as a starting point for setting appropriate noise limits for the sites, but they will need to be adjusted downwards in view of this information gap, in order to comply with the precautionary principle embedded within Article 6 of the Habitats Directive.

Another advantage of this approach is that it is possible to equate noise levels with habitat availability when deciding what an appropriate noise level limit should look like. The distance that noise levels are able to travel from the relevant noise source can be calculated and used to plot noise impacts. For example, in Germany it is assumed that if the 160 dB (SEL) threshold is complied with, measured at a distance of 750m, disturbance will occur within a radius of 8km. Plotting disturbance radiuses in this way means that it can be ensured that harbour porpoise have enough access to the cSAC.

2.1.3. It can be monitored and managed

The use of this approach in Germany and other European countries proves that the use of noise limits can be implemented and monitored. This is largely because: (i) overall noise level from source is a relatively easy parameter to measure and monitor for compliance with a noise level limit; and (ii) technology to reduce noise from pile driving and other construction activities already exists, meaning that noise limits can realistically be met while minimising the need to limit wind farm construction.

2.1.4. Information on noise thresholds for injury and disturbance are available in scientific literature

Best available scientific information is available to support the use of noise limits in management. This means that, where there is adequate information about harbour porpoise behaviour and populations, there can be sufficient certainty about the absence of adverse effects on the sites in relation to the chosen management approach, thus meeting the requirements of Article 6 of the Habitats Directive.

2.1.5. It can be factored into early stages of planning

Developers will have clarity from an early stage of the process about what noise limits cannot be exceeded and if and what mitigation will be required, allowing this to be factored in practically and financially at an early stage.

2.1.6. It has benefits for the range of species that might be impacted by piling noise

Harbour porpoise are particularly sensitive to underwater noise. Therefore, without any additional cost to a developer, noise limits will ensure protection of a range of marine mammals.

³ Southall, BL, Bowles, AE, Ellison, WT, Finneran, JJ, Gentrym RL, Greene, CR, Kastak, D, Ketten, DR, Miller, JH, Nachtigall, PE, Richardson, WJ, Thomas, JA and Tyack, PL, 2007. Marine Mammal Noise Exposure Criteria: Initial Scientific Recommendations. Aquatic Mammals, Volume 33, Number 4, 2007.

⁴ National Marine Fisheries Service, 2016 (NOAA). Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing: Underwater Acoustic Thresholds for Onset of Permanent and Temporary Threshold Shifts.

⁵ Lucke, K., U. Seibert, P.A. Lepper and M-A. Blanchet. 2009. Temporary shift in masked hearing thresholds in a harbour porpoise (*Phocoena phocoena*) after exposure to seismic airgun stimuli. Journal of the Acoustical Society of America, 125:4060 – 4070.

2.1.7. It encourages industry competition to develop the best technology

In some circumstances, the use of noise limits will require either the need for mitigation or alternative foundation technology to reduce noise impacts. Due to the increased competition and demand, technological and methodological improvements will be made which will in turn drive down the costs of noise reducing technologies and methods.

2.2. Assessing in-combination impacts

A North Sea noise limit is required to assess in-combination impacts, which is currently not in place. To assess in-combination impacts, an area-based approach is still required. However, as we do not know enough about harbour porpoise functioning, including important areas for activities such as feeding and breeding, we believe much more precautionary figures are required than those proposed by the IAMMWG. These would also be more in line with what is used by other European countries. Therefore, we propose:

- A maximum 10% relevant area of an SAC in a day; and
- An average 1% relevant area of an SAC over a season.

We see an area-based approach to assessing in-combination impacts as a temporary measure until North Sea Noise limits can be developed.

2.3 A comprehensive noise at sea reduction policy

It is essential that noise is managed at a wider seas level as well as at a cSACs level to ensure the functioning of harbour porpoise within their natural range, in line with Habitats Directive requirements. A noise at sea reduction policy is required at a UK level to establish a noise baseline, set noise limits and create a marine spatial plan that plots noise levels and limits, taking particular account of vulnerable areas such as the harbour porpoise cSACs. The spatial plan should then form the framework for all decision-making and overall noise limits should also be factored in to all decisions. The best way to avoid delays, costs, conflicts and environmental decline is to choose ecologically sound areas in the first place and technology with least impacts.

The recent Contract for Difference awards has shown how the costs of offshore wind have drastically reduced, with credit to the industry in achieving this. The driver of this however, has been government policy. A noise reduction policy is required to incentivise and encourage investment in mitigation technologies and methods and alternative foundation types, to reduce noise and avoid negative impacts on harbour porpoises and other marine mammals

3. Further measures required

For the successful management of harbour porpoise populations, we believe the following is required:

3.1. Strategic monitoring programme

To understand more about harbour porpoise trends, activity and behaviour within these cSACs, a long-term baseline and impact monitoring programme should be developed and implemented and we are pleased to see that JNCC is taking this forward. A strategic monitoring programme could be supported through a marine user strategic monitoring fund. Ongoing strategic monitoring provides a feedback loop into the management of noise, potentially enabling less precautionary noise level limits to be set in future, due to increased certainty about harbour porpoise behaviour and populations.

The existing [JNCC Noise Registry](#) is an essential tool for managing and analysing information and needs to be expanded to include high frequency (above 10kHz) impulsive noises and all other noises.

3.2. Noise modelling

Noise modelling is an essential tool as part of the impact assessment process, but currently each developer uses a different approach, which makes confidence in the results differ between developments. It also makes it very difficult to compare cumulative/in-combination impacts and therefore outcomes produced. Guidance and standardisation of noise modelling used to determine the impacts of noise from piling is required. Noise modelling should be ground-truthed at construction stage.

3.3. Population modelling

There are benefits in developing models to inform strategic management decisions. However, both the iPCoD and DEPONS model should be considered illustrative only at present due to the uncertainty in the data used to inform the outputs. To give us confidence, we would expect to see an analysis of the data used in both models, including the attachment of confidence values.

We believe a coordinated programme of research is required to inform future model development, much of which can be built upon the DEPONS research recently undertaken. Ground truthing modelling data with monitoring is essential.

3.4. Review and update of guidance

To ensure consistent and effective assessment of noise impacts on harbour porpoise cSACs, relevant and up to date guidance is required. [JNCC piling guidance](#) is now out of date and should be reviewed considering the submission of harbour porpoise cSACs to the European Commission. This should include an assessment of the disturbance impacts of soft starts and possible injury and disturbance impacts of Acoustic Deterrent Devices (ADDs) for the range of species using the site, currently recommended as part of the JNCC piling guidelines. Other guidance such as that relating to [UXO clearance](#) should also be reviewed. Detailed conservation advice is also required. We would welcome involvement in the development and review of any guidance.

3.5. Development of a strategic in-combination and cumulative assessment

It is extremely difficult for individual developers to undertake in-combination and cumulative assessments. The assessment can only be based on the best publicly available quantitative information, which often results in inconsistent assessments between developments and means that a full picture of noise producing activity is never achieved. In addition to this, Environmental Statements and HRAs for individual projects use differing methodologies and different countries bordering the North Sea have different management policies. To ensure a consistent and holistic approach to in-combination and cumulative assessments, a strategic approach is required which includes greater standardisation of the way noise impacts are assessed. This is required at both a cSAC and Management Unit level.

3.6. Underwater noise forum

An independently-chaired forum, made up of regulators, governments, industry and NGOs, is essential to discuss key noise management issues in relation to harbour porpoise cSACs.

Underwater noise management is in its infancy and it is important that findings and new information is regularly shared to inform future noise management. The management of all sources of noise also needs to be considered alongside management of other activities that can impact porpoises (e.g. fisheries bycatch).

4. Next steps

We do not believe that the current proposed area-based threshold approach to underwater noise management will achieve the site's conservation objectives or comply with the law and therefore we are advocating the use of noise limits for the project alone assessment, and more precautionary area-based thresholds for the in-combination assessment.

We believe more discussion is required on the management of underwater noise and any future proposals should be developed and agreed at a UK level as part of a transparent process in consultation with regulators, SNCBs, industry and NGOs. We suggest the best way forward would be through a second workshop with regulators, SNCBs, industry and NGOs to discuss noise limits as a future management option within a package of wider noise reduction measures.

DRAFT

Appendix A: View on the area-based threshold approach

As set out above, we cannot support the area-based threshold approach⁶ proposed by IAMMWG for the following reasons:

1. Non-compliance with the Habitats Directive

The area-based threshold figures that have been proposed are based on the carrying capacity of the cSACs. Firstly, there is not enough scientific evidence to understand what the carrying capacity is for harbour porpoise sites. Secondly, each cSAC may have a different carrying capacity depending on the status of the population and pressures it is under. There is therefore insufficient evidence to show that these noise threshold figures will meet the conservation objectives for these sites of (i) ensuring the harbour porpoise remains a viable component of the site; and (ii) avoiding significant disturbance of the species.

These conservation objectives must be interpreted through the lens of Habitats Directive requirements. What this means is that the overall objective of the legislation, i.e. in this context to achieve Favourable Conservation Status for harbour porpoise, must not be compromised. In other words, noise levels must not be permitted to negatively impact on harbour porpoise populations, range or habitat – if they did, this would constitute an adverse effect on site integrity, in breach of Habitats Directive requirements. This is confirmed by the JNCC, which states that the overall conservation objective for these sites is *“To ensure that the integrity of the site is maintained and that it makes an appropriate contribution to maintaining Favourable Conservation Status (FCS) for harbour porpoise in UK waters”*.⁷

We have set out the legal position in more detail below.

1.1. Favourable conservation status

Management of EMSs must ensure that "favourable conservation status" is achieved, or recovered, for a site's designated or classified features.⁸

In relation to species, Article 1(i) of the Habitats Directive confirms that a species will be in FCS where:

- I. the population is stable;
- II. the nature range of the species is not being or likely to be reduced; and
- III. there is a sufficiently large habitat to maintain populations on a long-term basis.

This means that, broadly speaking, in order to comply with their Article 6 duties, the authorities need to ensure that noise levels do not prevent the outcomes listed at (i)-(iii) above from being achieved.

1.2. Article 6 Habitats Directive (HD) and the precautionary principle

Article 6(3) HD provides that, where a plan or project may have a significant effect on a site, the competent national authorities shall agree to that plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned.

⁶ A potential approach to assessing the significance of disturbance against conservation objectives of the harbour porpoise cSACs. Discussion document. Version 3.0. Distributed by JNCC for the noise management in harbour porpoise cSACs workshop 27th February 2017.

⁷ See for example <http://jncc.defra.gov.uk/page-7241>

⁸ Article 2(2) Habitats Directive

Therefore, plans or projects that will generate underwater noise can only take place if it is certain the activity will not have an adverse effect on the integrity of the site concerned. In order for site integrity not to be adversely affected, the site must be preserved at "favourable conservation status". We have already discussed the meaning of this above and the associated need to avoid the negative outcomes listed.

In addition, authorities must adhere to the precautionary principle when making decisions. Therefore, "certainty" in this context means situations "where *no reasonable scientific doubt remains* as to the absence of such [adverse] effects"⁹ (our emphasis).

This means that the authorities must not permit an activity to go ahead if there is insufficient evidence forthcoming from their assessment to exclude the possibility of harm to site integrity arising out of that activity. In the same way, the authorities may not authorise a management approach if there is insufficient evidence to show that the approach will exclude the possibility of harm to site integrity arising from the activity that is being managed.

The European Court has confirmed that in the case of permanent damage a small loss may still amount to a loss of site integrity.¹⁰

2. Unsound methodology

The area-based threshold approach is based on the management of bycatch. Bycatch and disturbance are in fact unrelated and it is not an appropriate or scientifically robust methodological approach to based disturbance management on bycatch management.

3. It provides weaker protection than other European countries

The UK would end up with a weaker management regime for noise *inside* these high-density sites than other North Sea countries have *outside* of their own harbour porpoise SACs. As harbour porpoise are a mobile species, an approach that is cohesive with our European neighbours is required in order to ensure the FCS of harbour porpoise and comply with Habitats Directive requirements relating to the strict protection of this species throughout its range. Also, underwater noise management based on noise limits is a tried and tested method in countries such as Germany that has been shown to be effective; we do not need to reinvent the wheel to implement a sound, legally compliant management approach.

4. It does not encourage or incentivise noise reduction

Such an arbitrary spatial approach on its own offers no motivation for individual sea users or developers to take positive measures to reduce underwater noise and would simply open up space for other less responsible users. It also favours developers who pile early in the season.

⁹ Case C-127/02 *Waddenzee* - answer to question 4 put to the Court

¹⁰ See Case C-258/11 *Sweetman v .*