



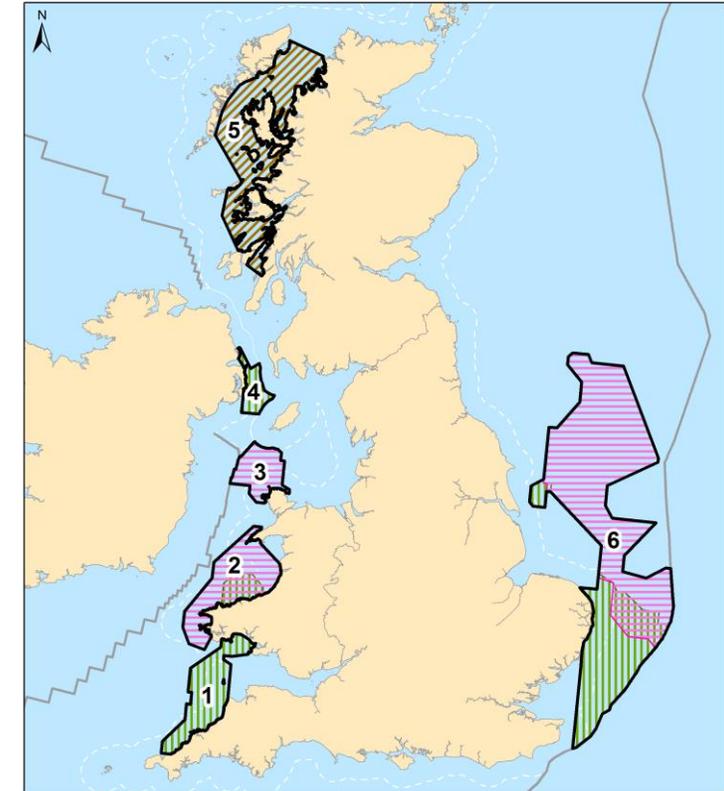
Noise management in harbour porpoise marine protected areas (UK example)

Sónia Mendes

Harbour porpoise Special Areas of Conservation (SACs)

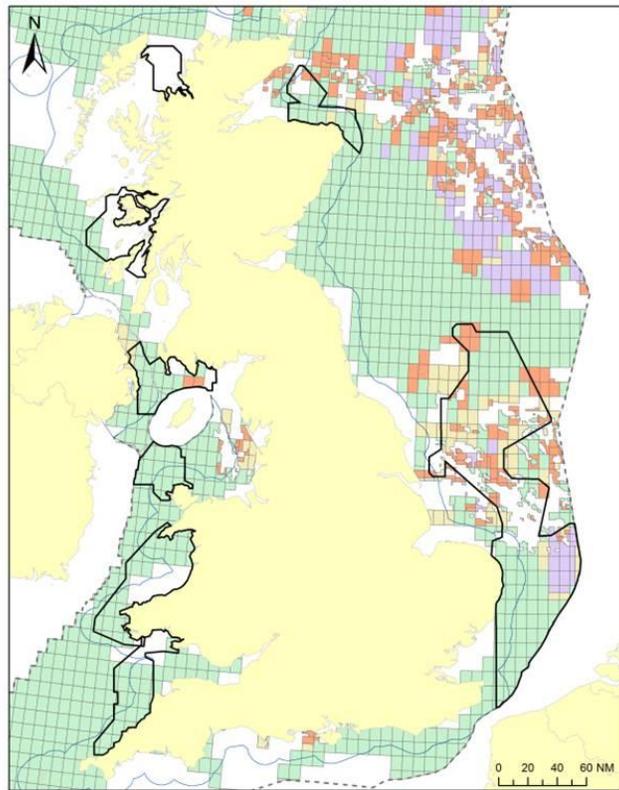


- Areas that persistently have higher densities of harbour porpoise
- Good foraging opportunities or other environmental factors that make them prime habitats for the species
- Areas identified despite a certain level of local disturbance by underwater noise

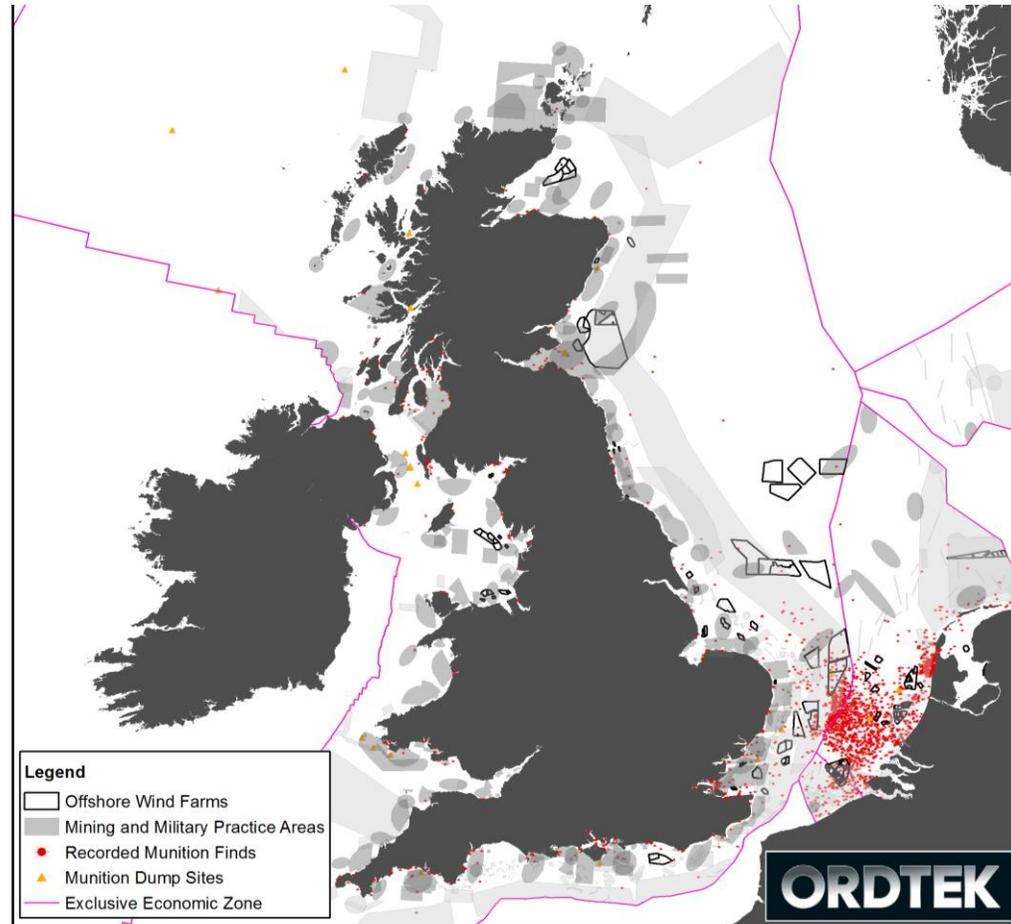


Southern North Sea SAC is a busy place

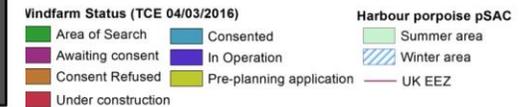
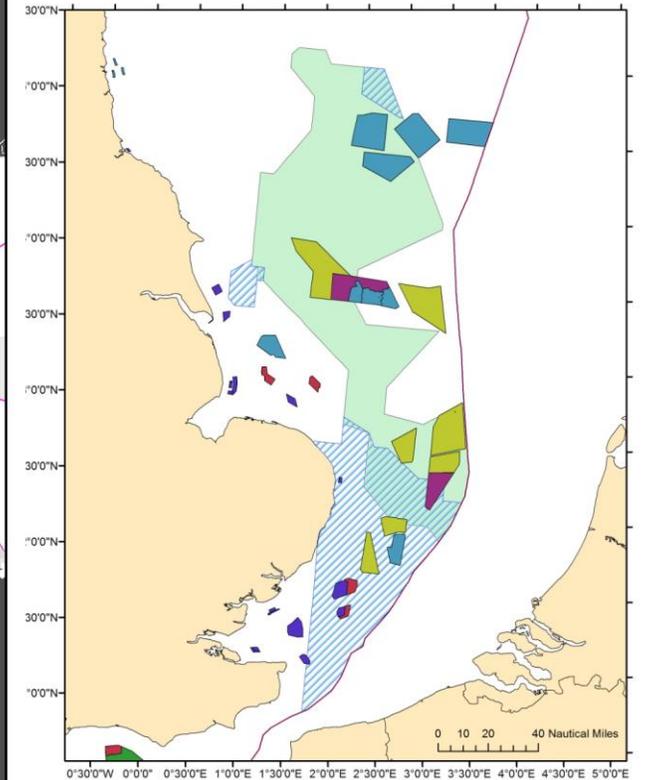
Oil and Gas exploration



Unexploded ordnance



Offshore wind farm installation





**Guidance for assessing the significance of noise
disturbance against Conservation Objectives of harbour
porpoise SACs**

(England, Wales & Northern Ireland)

JNCC Report No. 654



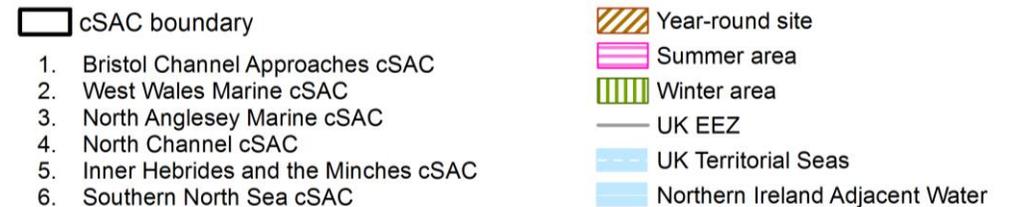
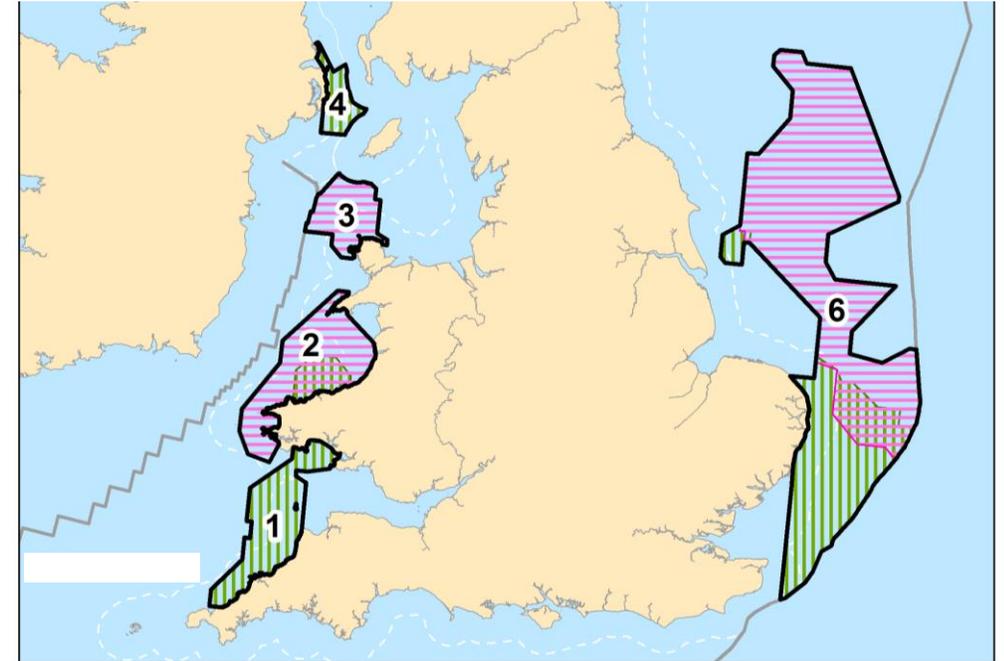
May 2020

<https://hub.jncc.gov.uk/assets/2e60a9a0-4366-4971-9327-2bc409e09784>

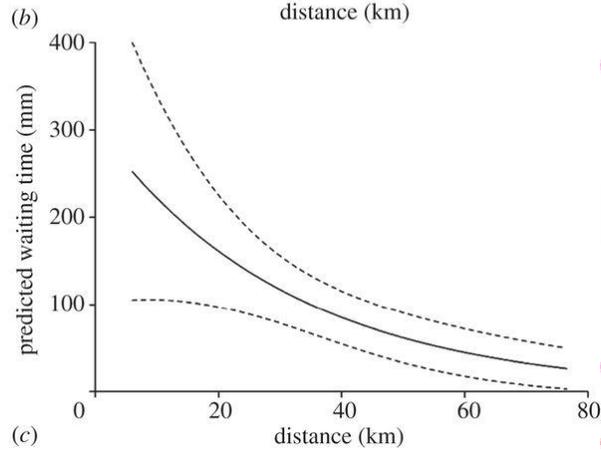
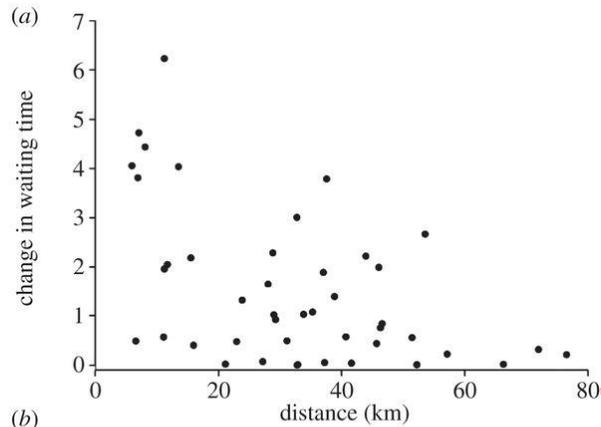
1. Area/time noise limits

Noise disturbance within a SAC from a plan/project individually or in combination should not displace harbour porpoises from:

- More than an average of **10%** of the relevant area of the site over a **season**.
- More than **20%** of the relevant area of the site in any given **day**

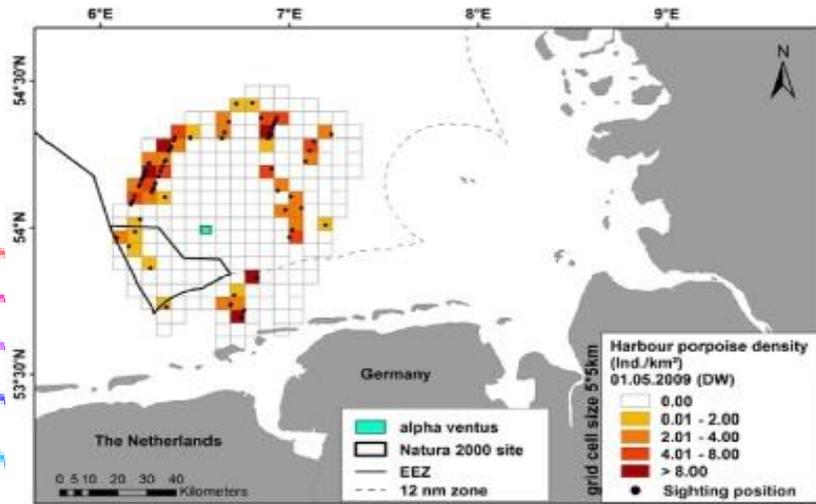


2: Effective Deterrence Ranges



Thompson et al 2013. *Proceedings Royal Society*

Sarnocińska et al. 2020. *Frontiers in Marine Science*



Michael Dähne et al 2013 *Environ. Res. Lett.*

Activity	EDR (km)	References in which EDRs were based
Monopile	26	Tougaard et al. 2013; Dähne et al. 2013
Monopile with noise abatement	15	Dahne et al. 2017, Rose et al. 2019
Pin-pile (with and without noise abatement)	15	Graham et al. 2019
Conductor piling for oil & gas wells	15	Jiang <i>et al.</i> 2015, MacGillivray 2018, Graham et al. 2019
UXO	26	based on monopile EDR
Seismic (airguns) survey	12	Thompson et al. 2013; Sarnocińska et al. 2020
Other geophysical surveys	5	Crocker & Fratantonio 2016, Crocker et al. 2019

Realistic in combination scenarios

Table 76: Potential in-combination pile-driving scenarios for consented offshore wind farms subject to this review.

Wind Farms Subject to Review	Consented Wind Farms													
	Galloper	Greater Gabbard	Dudgeon	Hornsea Project One	Hornsea Two	East Anglia One	East Anglia Three	Triton Knoll	Creyke Beck A	Creyke Beck B	Teesside A	Teesside B	Mermaid	Borssele II
Galloper	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Greater Gabbard	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Dudgeon	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Hornsea Two	X	X	X	X	X	Y	Y	X	Y	Y	Y	Y	X	X
Creyke Beck A	X	X	X	X	Y	Y	Y	Y	X	Y	Y	Y	X	X
Creyke Beck B	X	X	X	X	Y	Y	Y	Y	Y	X	Y	Y	X	X
Teesside A	X	X	X	X	Y	Y	Y	X	Y	Y	X	Y	X	X
Teesside B	X	X	X	X	Y	Y	Y	X	Y	Y	Y	X	X	X

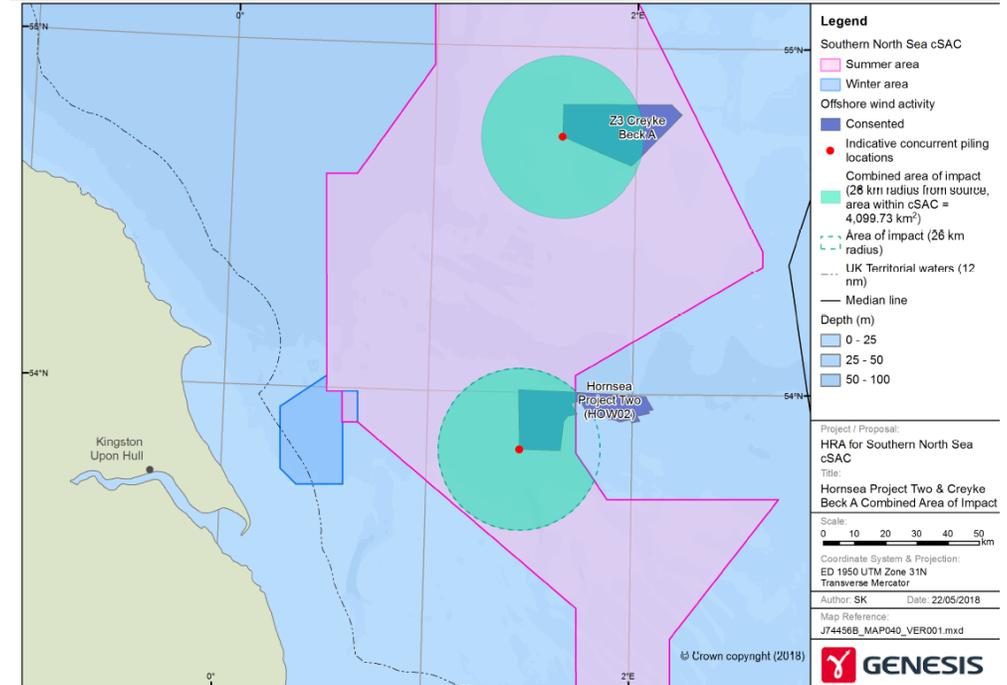


Table 78: Worst-case in-combination seasonal spatial overlap for Hornsea Two and Creyke Beck A offshore wind farms within the SCI.

SCI area	Maximum area of SCI impacted (km ²)	% of area	No. of turbines	Estimated duration of impact (days)	Seasonal spatial overlap (as % spatial overlap)
In-combination pile-driving (consented)					
'summer'	4,100	15.2	300	183	15.2
In-combination pile-driving (Planned)					
'summer'	4,100	15.2	177	179	14.9

>10% seasonal threshold (4.8-15.2%)

< 20% daily threshold

Example of implementation of threshold approach Summer 2019

- In combination assessment suggested that **both the 20% daily and 10% seasonal threshold could be exceeded**
- Measures for not exceeding thresholds:
 - Reducing the numbers of UXOs detonated each day,
 - Daily UXO detonations within 5 km of a central point,
 - Seismic survey to be part carried out after 31st October

Clear communication between companies and regulators

Retrospective look at impulsive noise in the SNS SAC (2015-2020)



Using UK Marine Noise Registry data to investigate:

- daily and seasonal disturbance footprints (% area)
- distribution of noise events in time and space for different sources
- contribution of different noise sources to disturbed area

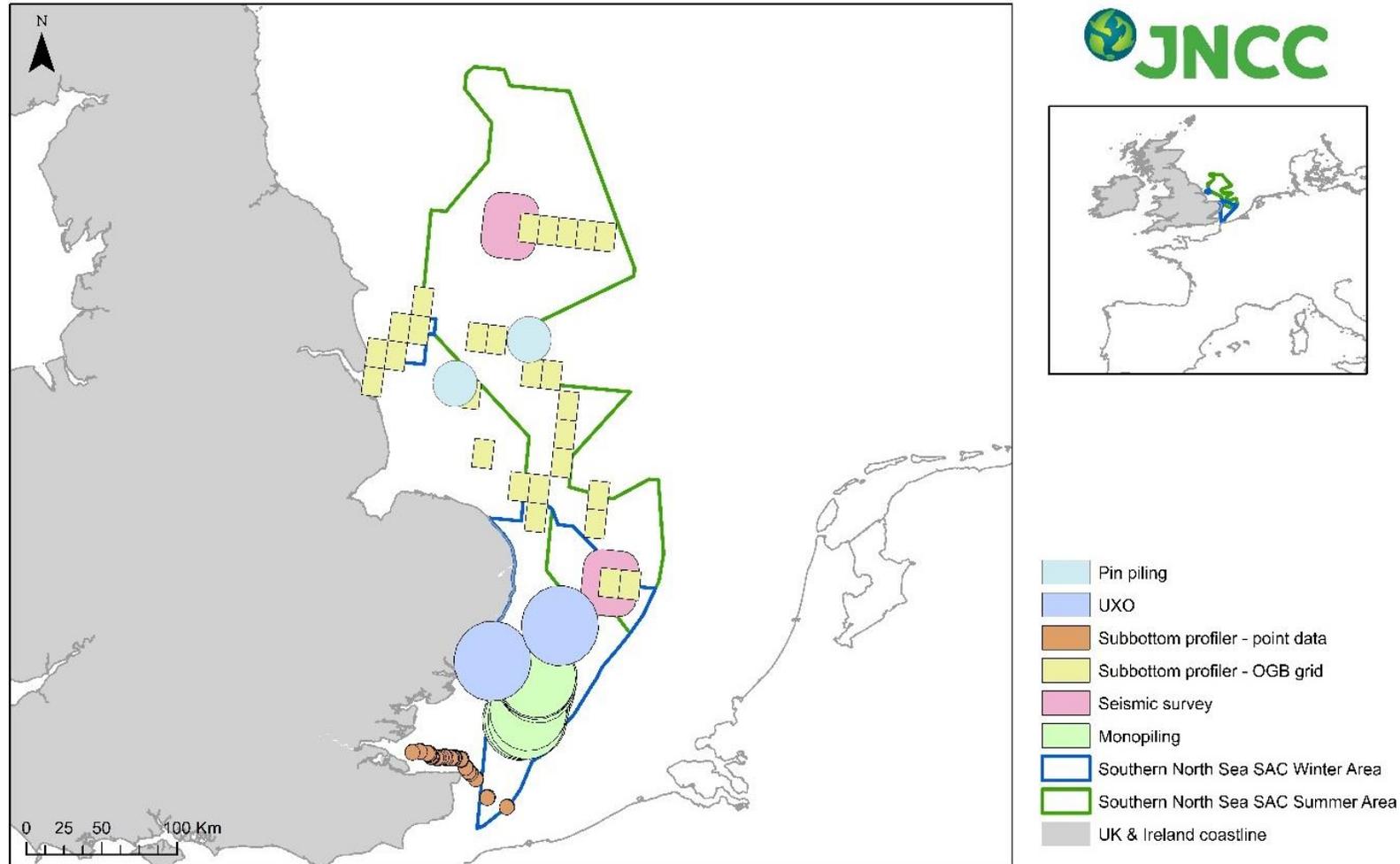


Department
for Environment
Food & Rural Affairs

Funded by OWEAP – Offshore Wind
Enabling Actions Programme

Sources:
http://www.theconstructionindex.co.uk/assets/news_articles/2012/09/1348210210_offshore-windfarm.jpg; <http://floridapolitics.com/wp-content/uploads/2016/11/seismic-surveys.jpg>;
[https://upload.wikimedia.org/wikipedia/commons/thumb/7/70/USS_Arkansas_\(CGN-41\)_shock_trials.jpg/750px-USS_Arkansas_\(CGN-41\)_shock_trials.jpg](https://upload.wikimedia.org/wikipedia/commons/thumb/7/70/USS_Arkansas_(CGN-41)_shock_trials.jpg/750px-USS_Arkansas_(CGN-41)_shock_trials.jpg);

Effective deterrence ranges for activities resulting in impulsive noise



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Days with noise and estimated area disturbed in the respective seasonal SAC area (2015 to 2020)

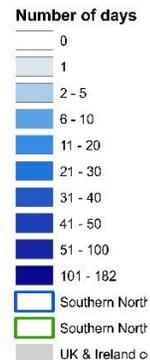
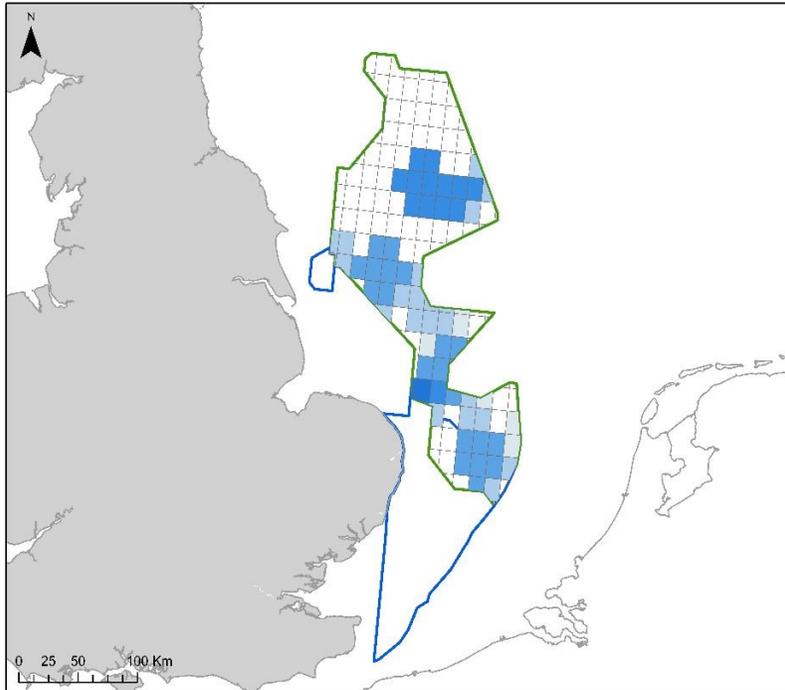


Period	Days with noise out of 182 days/winter and 183 days/summer	Maximum daily area disturbed (%)	Seasonal average area disturbed (%)
Winter 2014 to 2015	2	9.25	0.09
Summer 2015	45	21.02	1.34
Winter 2015 to 2016	0	0	0
Summer 2016	16	0.67	0.05
Winter 2016 to 2017	83	19.08	7.38
Summer 2017	11	5.33	0.16
Winter 2017 to 2018	9	3.82	0.09
Summer 2018 ¹	107	10.23	1.08
Winter 2018 to 2019	93	16.47	1.73
Summer 2019	93	7.27	1.42
Winter 2019 to 2020	5	10.09	0.22
Summer 2020	26	8.00	0.55

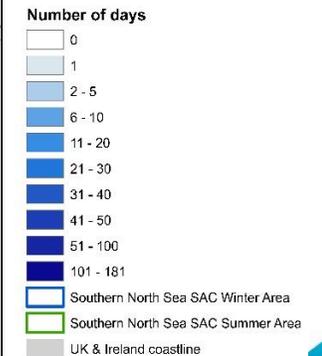
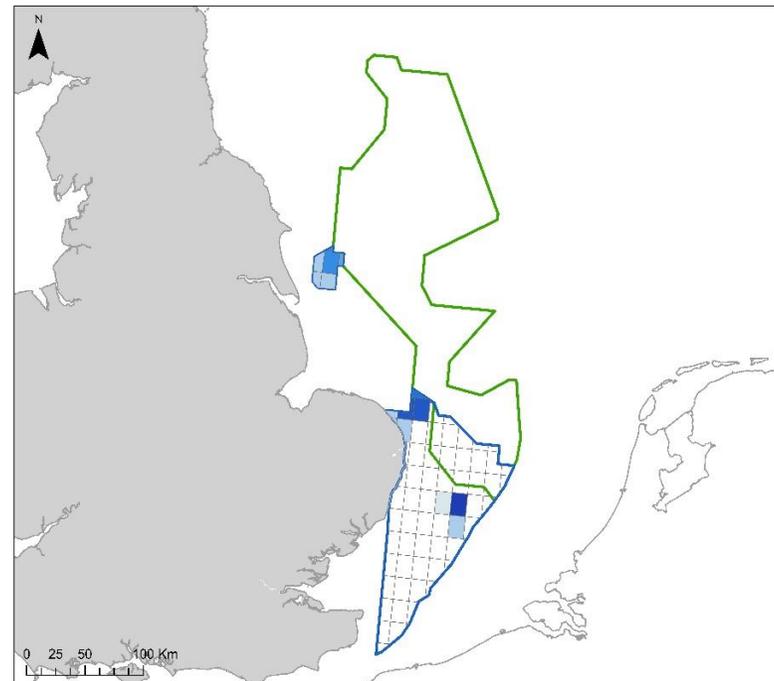
It is likely that figures for Summer 2018 are an underestimate as the MNR did not have data on the installation of mono-piles for the Hornsea One wind farm, at the time of this analysis.

Sources:
http://www.theconstructionindex.co.uk/assets/news_articles/2012/09/1348210210_offshore-windfarm.jpg; <http://floridapolitics.com/wp-content/uploads/2016/11/seismic-surveys.jpg>;
[https://upload.wikimedia.org/wikipedia/commons/thumb/7/70/USS_Arkansas_\(CGN-41\)_shock_trials.jpg/750px-USS_Arkansas_\(CGN-41\)_shock_trials.jpg](https://upload.wikimedia.org/wikipedia/commons/thumb/7/70/USS_Arkansas_(CGN-41)_shock_trials.jpg/750px-USS_Arkansas_(CGN-41)_shock_trials.jpg);

Spatio-temporal distribution of noise events (example: 2018)

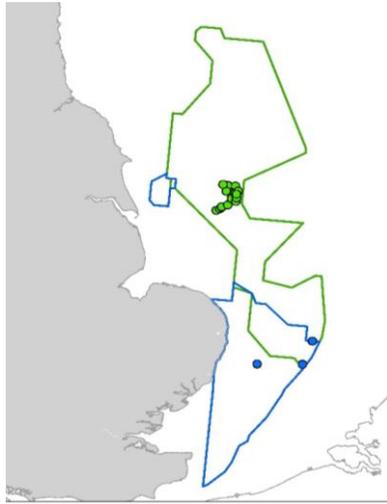


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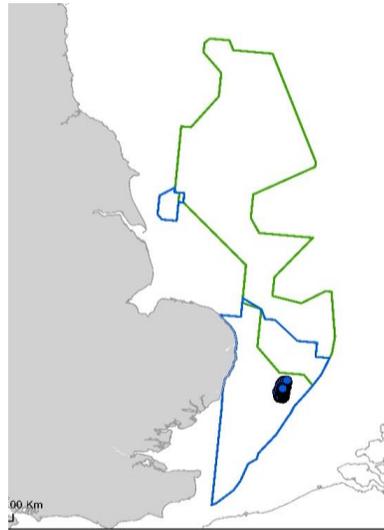


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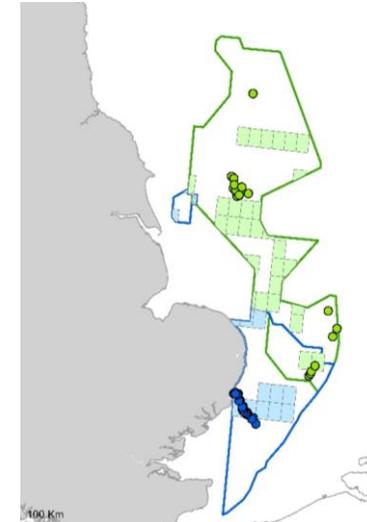
Spatial distribution of noise sources (2015 to 2020)



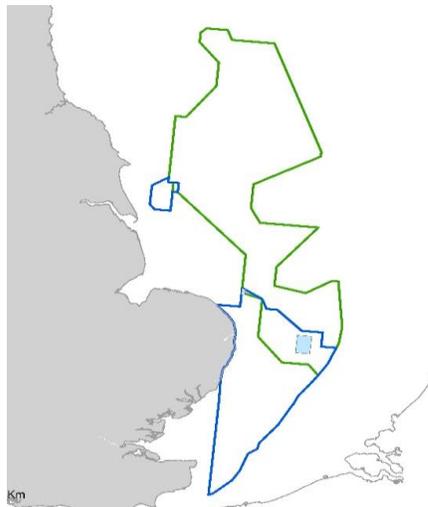
Explosives



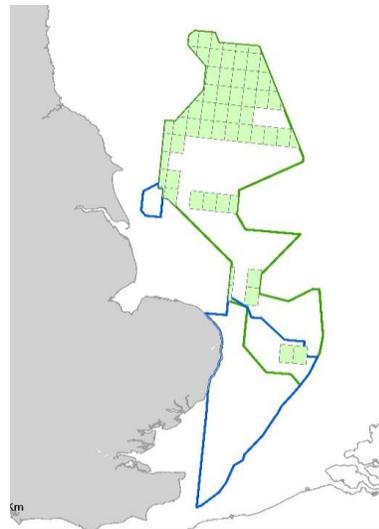
Pin piling



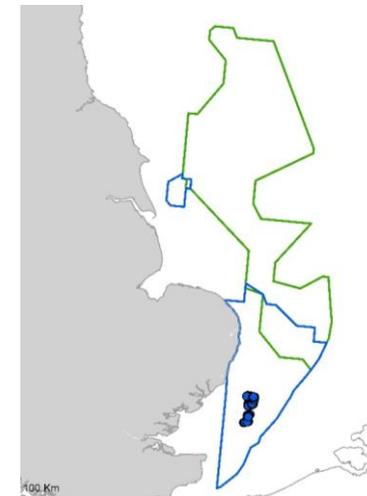
Sub-bottom profilers



Seismic in winter area

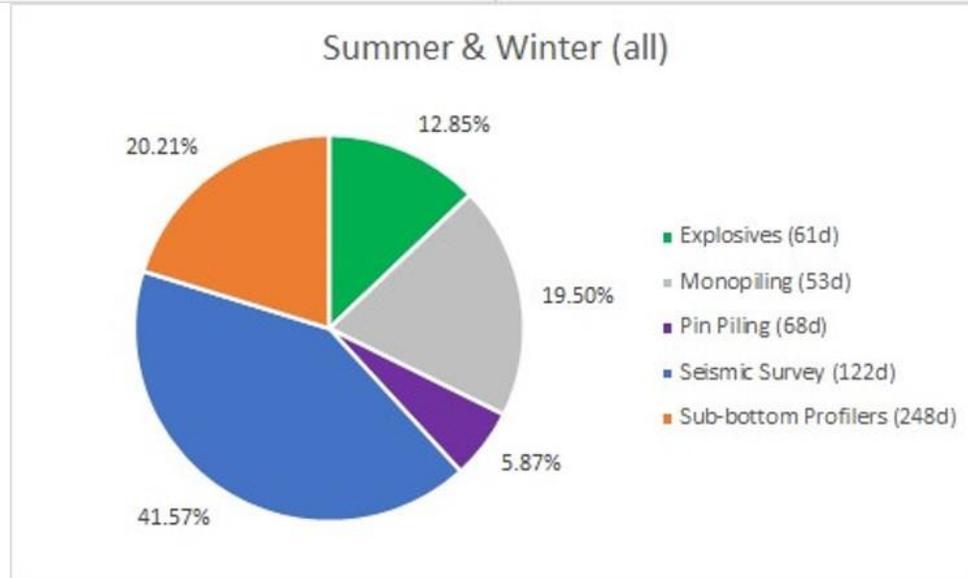
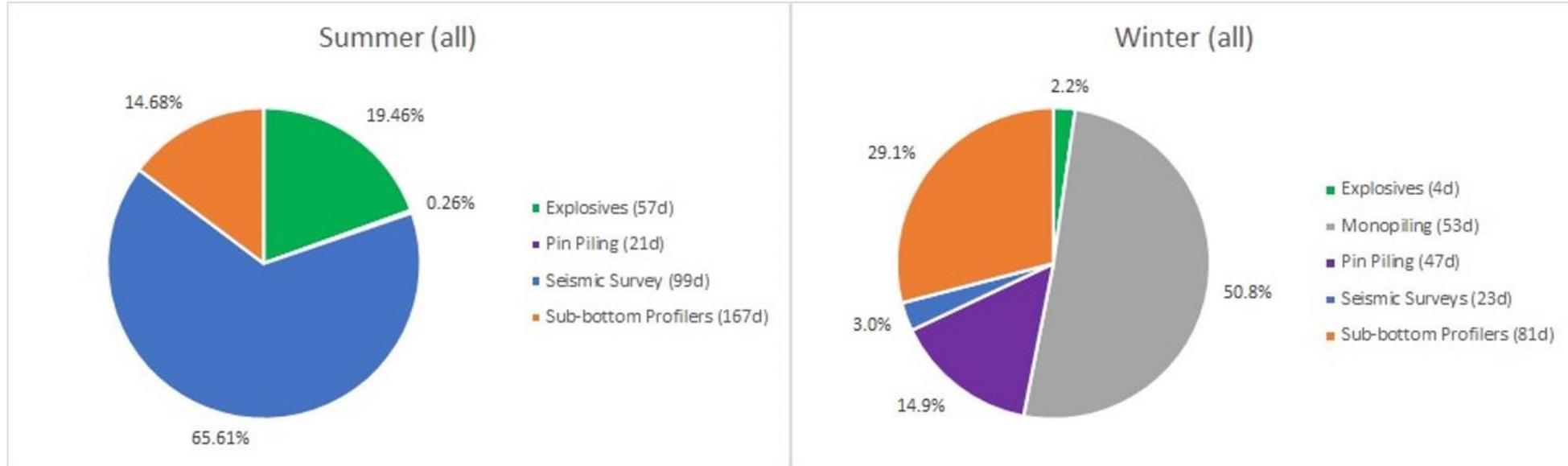


Seismic in summer area



Mono piling

The contribution of different activities to the estimated area disturbed by noise (2015-2020)



Retrospective and forward looks can be used to support assessment, planning, management and monitoring

- Compliance retrospective monitoring
- Potential to overlay noise pressure with species distribution
- Identify spatial and seasonal patterns of past activities to help better plan and regulate future ones in order to avoid significant disturbance
- Standardise and speed up cumulative assessments of planned activities, helping with regulation and management

In summary, the 10/20% noise limit approach:

- Applies equally to all industries
- Is pragmatic recognising that porpoise habitats within these sites should be able to cope with a certain level of noise disturbance whilst still providing those important functions for which they were designated
- Is relatively simple but relies on good environmental impact assessments, good regulation, good reporting and monitoring
- Incentivises industry to look for less noisy alternatives and other ways to reduce their disturbance footprint in time and space
- Will be reviewed regularly to see if it's working at reducing noise in the sites, if it's feasible and based on the best available evidence