BMP workshop March 2017

Joint Nature Conservation Committee

Lessons learned - a UK conservation agency perspective

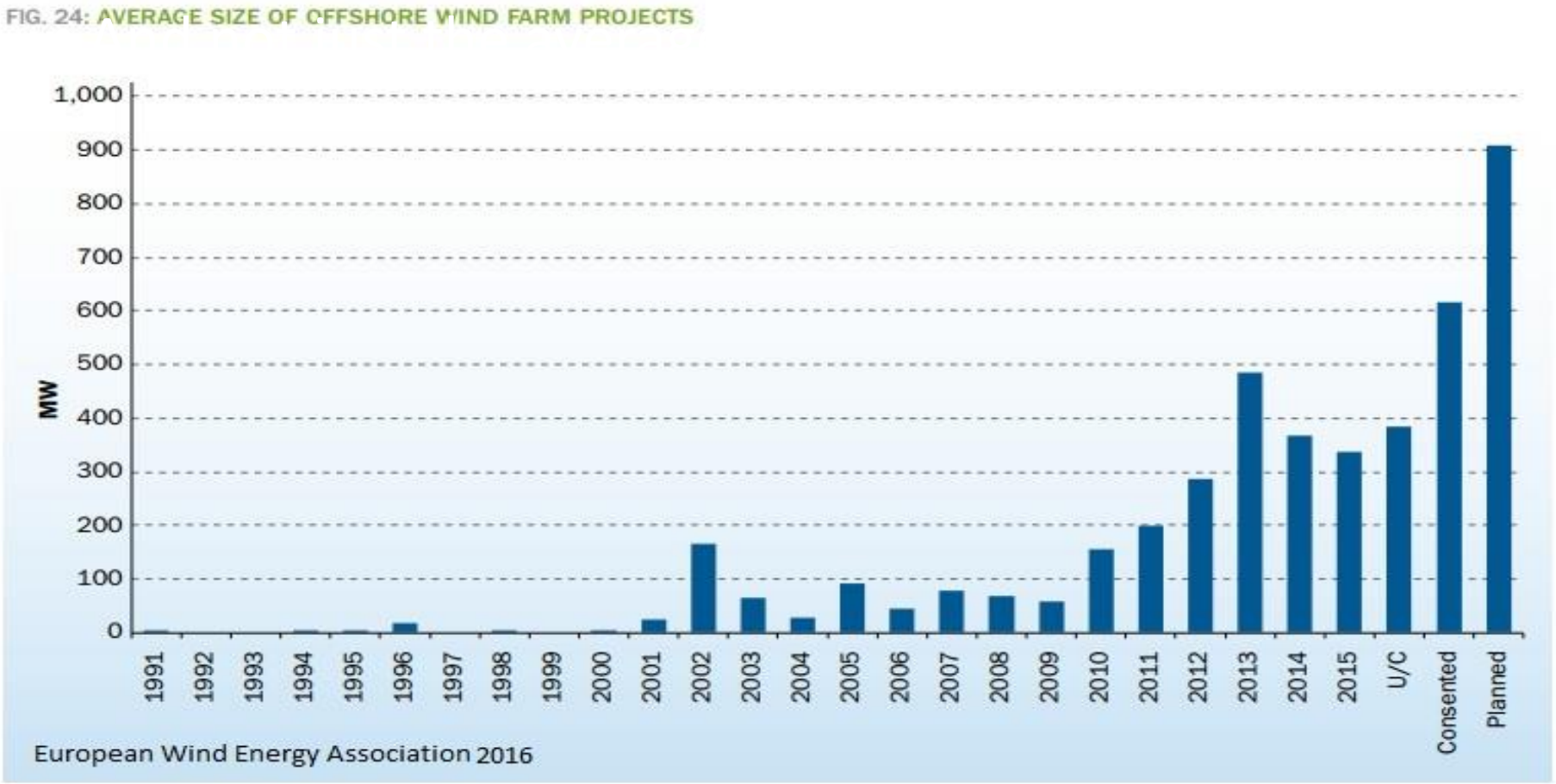
Dr. Sónia Mendes

JNCC is a statutory adviser to UK Government and devolved administrations

UK Offshore Wind Development

- 91% of global offshore wind energy is in Europe
- 40% of these are in UK's waters

Increase in size of offshore wind farms

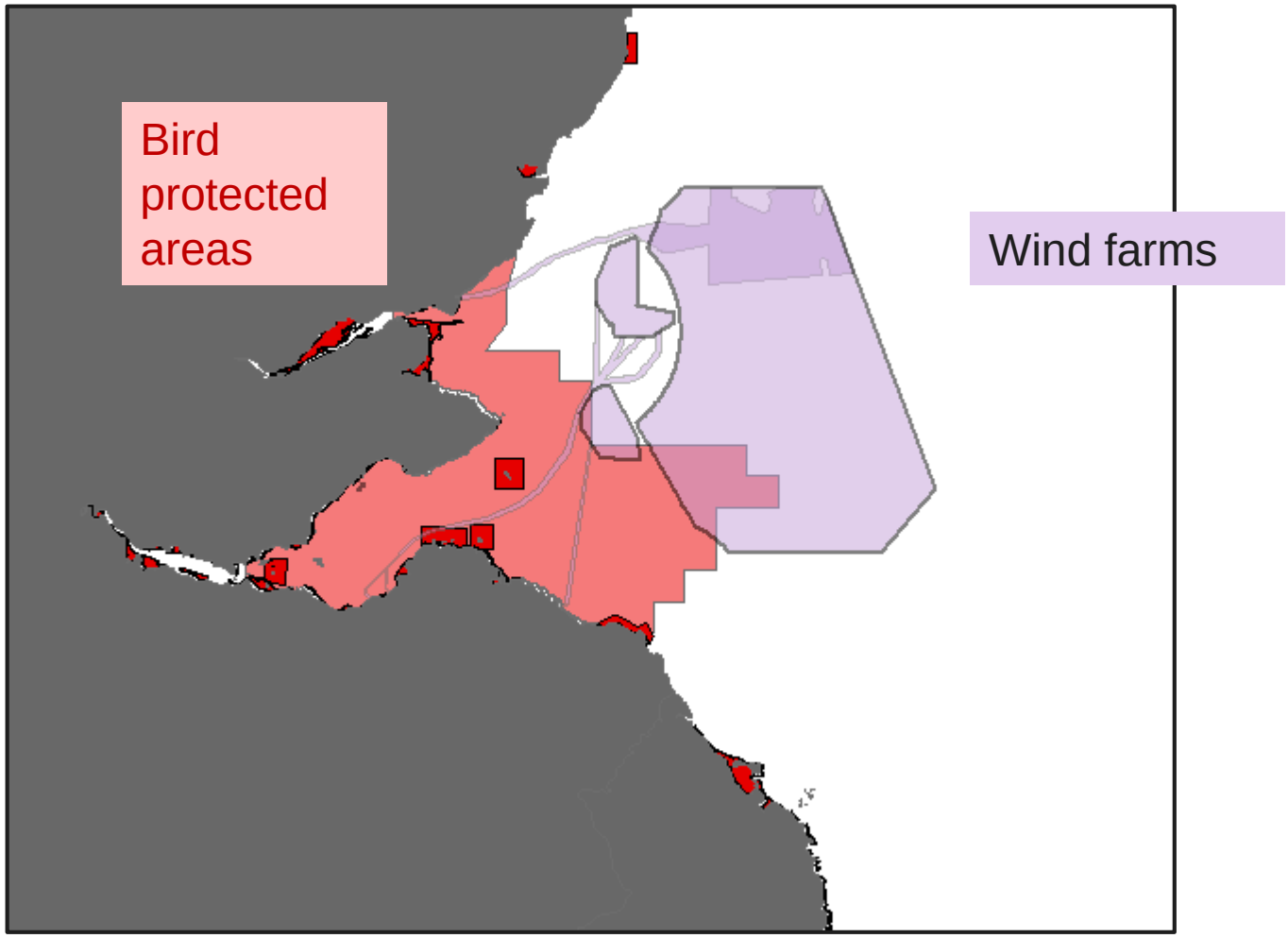


All cetaceans are protected from killing, injury and disturbance

Habitats Directive
Article 12


Planning
Assessment
Mitigation
Monitoring

The siting of developments



When important habitats are ignored in the siting of developments…

reNEWS

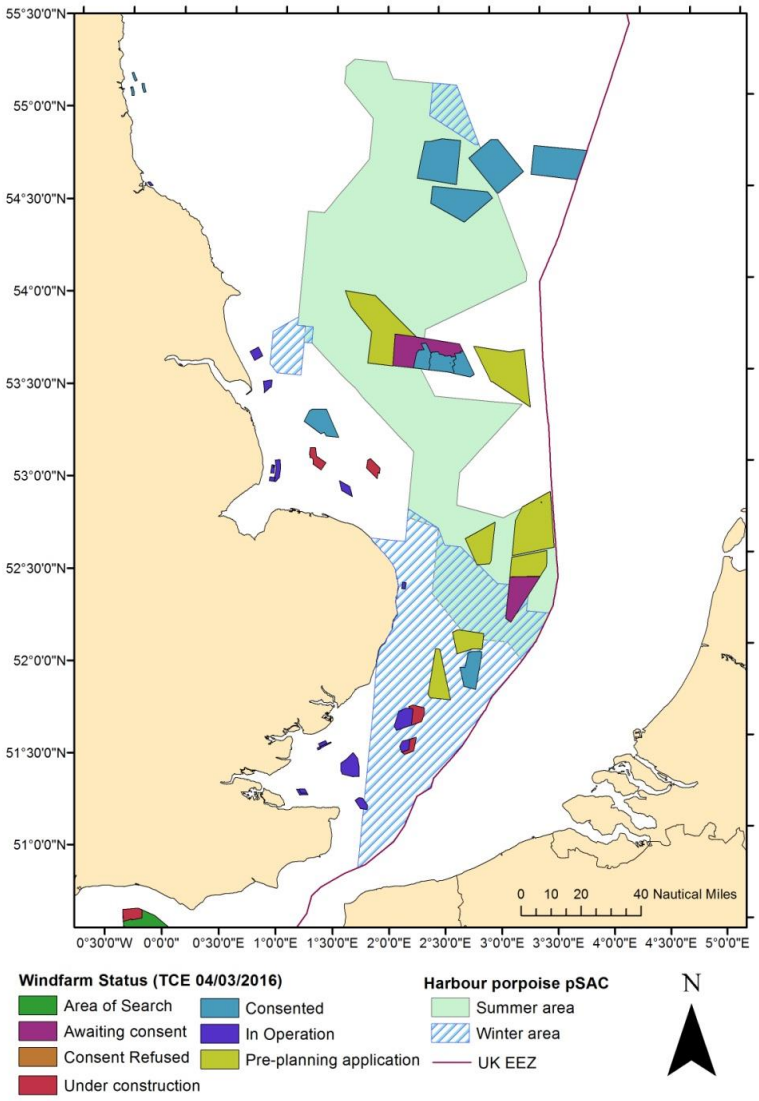
Scots kill 2.3GW offshore consents

THE SCOTSMAN
SCOTLAND'S NATIONAL NEWSPAPER

Offshore wind power 'pretty much dead'

More info: http://www.rspb.org.uk/our-work/rspb-news/news/422275-rspb-scotland-statement-on-offshore-windfarm-judicial-review-decision

Oops…when important habitats are identified <u>after</u> developments have been sited and in some cases consented



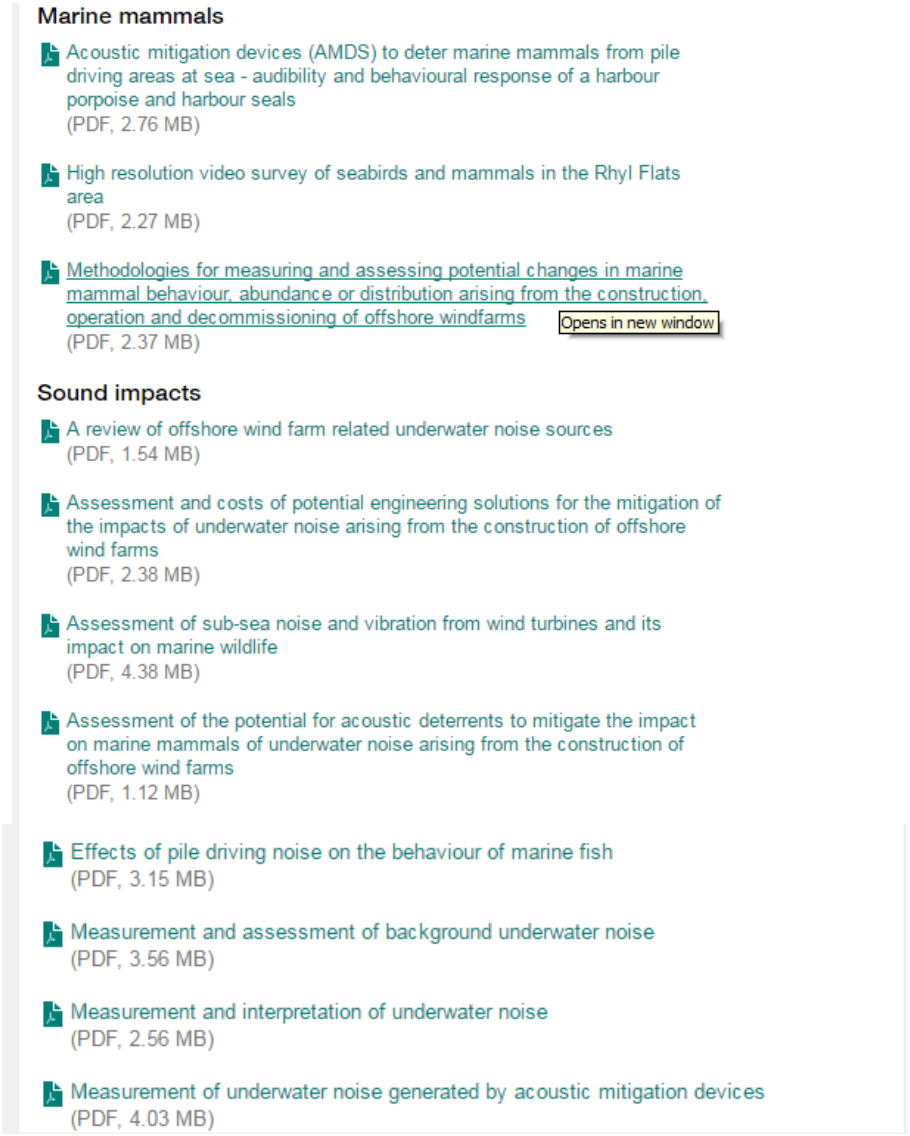

Planning
Assessment
Mitigation
Monitoring

Environmental risk assessment

Environmental risk assessment

Strategic collaborative research

COWRIE (Collaborative Offshore Wind Research into the Environment)



Marine mammals

Acoustic mitigation devices (AMDS) to deter marine mammals from pile driving areas at sea - audibility and behavioural response of a harbour porpoise and harbour seals
(PDF, 2.76 MB)

High resolution video survey of seabirds and mammals in the Rhyl Flats area
(PDF, 2.27 MB)

Methodologies for measuring and assessing potential changes in marine mammal behaviour, abundance or distribution arising from the construction, operation and decommissioning of offshore windfarms
(PDF, 2.37 MB)

Opens in new window

Sound impacts

A review of offshore wind farm related underwater noise sources
(PDF, 1.54 MB)

Assessment and costs of potential engineering solutions for the mitigation of the impacts of underwater noise arising from the construction of offshore wind farms
(PDF, 2.38 MB)

Assessment of sub-sea noise and vibration from wind turbines and its impact on marine wildlife
(PDF, 4.38 MB)

Assessment of the potential for acoustic deterrents to mitigate the impact on marine mammals of underwater noise arising from the construction of offshore wind farms
(PDF, 1.12 MB)

Effects of pile driving noise on the behaviour of marine fish
(PDF, 3.15 MB)

Measurement and assessment of background underwater noise
(PDF, 3.56 MB)

Measurement and interpretation of underwater noise
(PDF, 2.56 MB)

Measurement of underwater noise generated by acoustic mitigation devices
(PDF, 4.03 MB)

More info:
https://www.thecrownestate.co.uk/energy-minerals-and-infrastructure/downloads/cowrie/

Strategic collaborative research

centrica · DONG energy · e·on · EDF ENERGY
edp renewables · Eneco · FLUOR · MAINSTREAM RENEWABLE POWER
REPSOL · innogy · SCOTTISHPOWER RENEWABLES · SIEMENS
SSE Renewables · Statkraft · Statoil · VATTENFALL

More info: https://www.carbontrust.com/client-services/programmes/offshore-wind/offshore-renewables-joint-industry-programme-orjip/

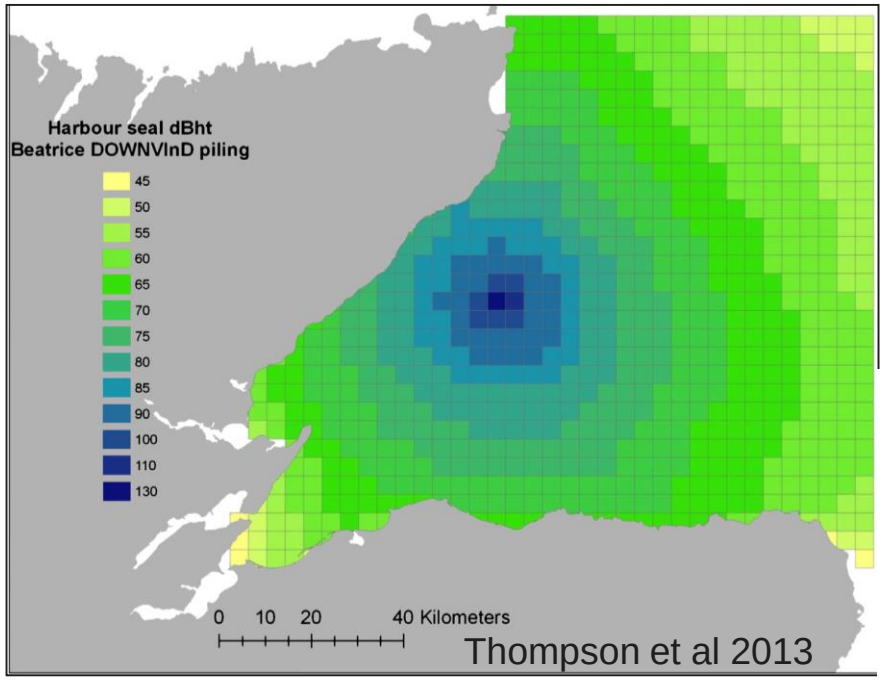
Risk of hearing damage and disturbance from piling noise

Risk of hearing damage and disturbance from piling noise

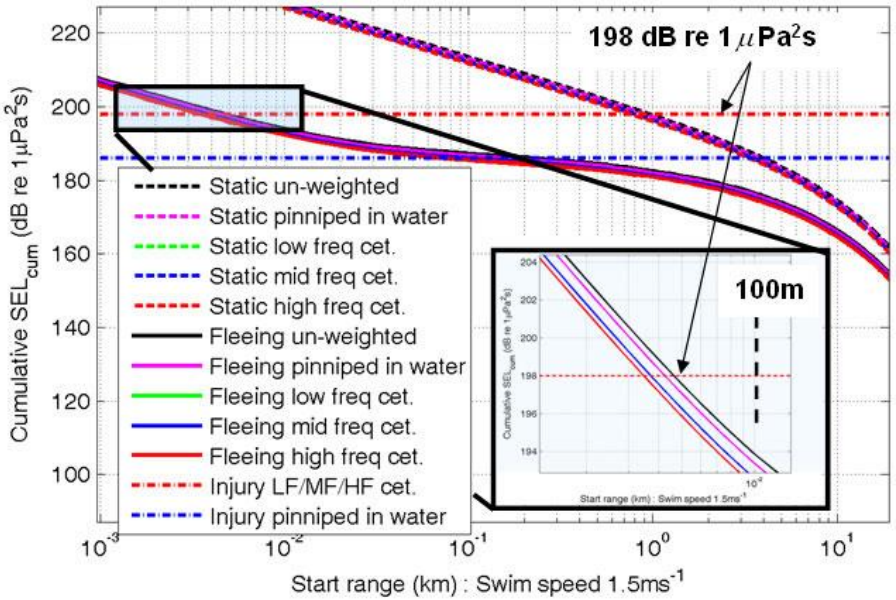
No piling

‘No problem’

Risk of hearing damage and disturbance from piling noise

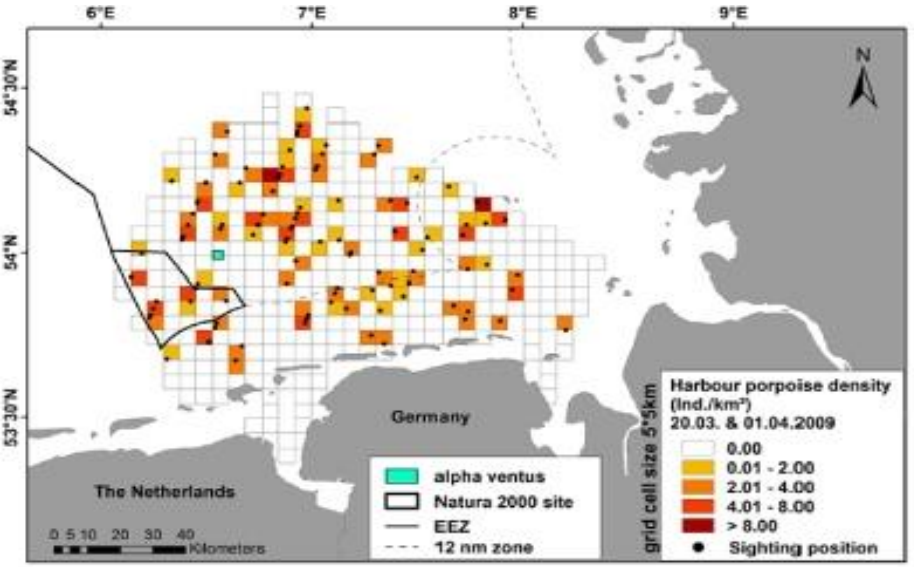


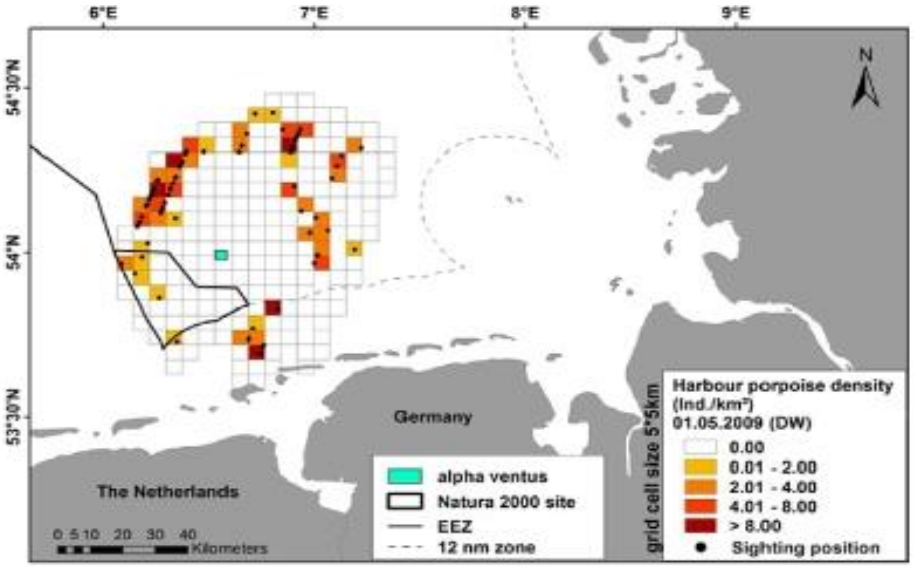
Thompson et al 2013



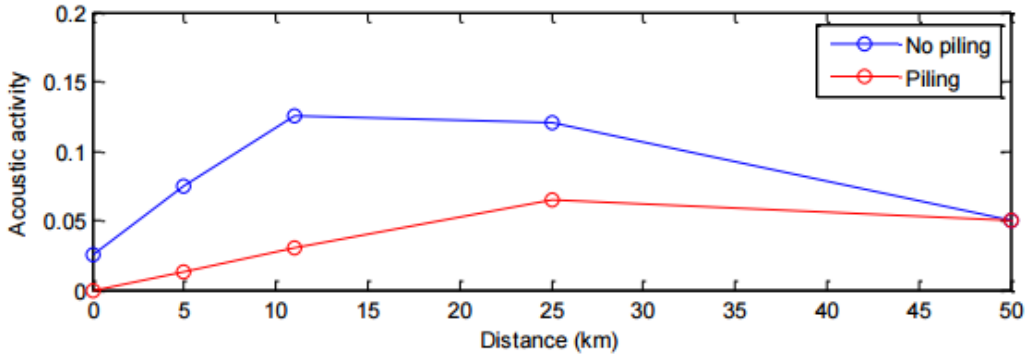
Lepper et al 2012

Effects of pile-driving on harbour porpoises at the first offshore wind farm in Germany





a)



Michael Dähne et al 2013 Environ. Res. Lett.


Planning
Assessment
Mitigation
Monitoring

Reducing the risk of hearing damage (PTS onset)

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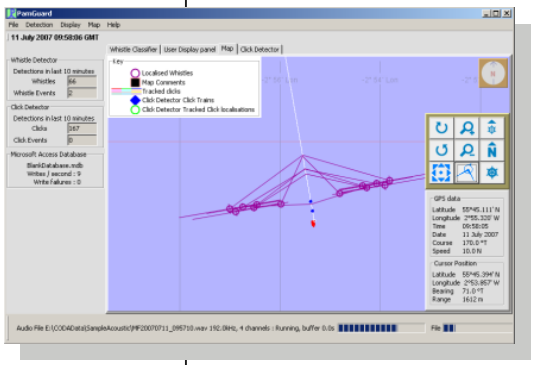
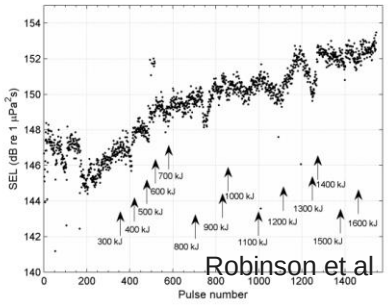


Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise

August 2010



Robinson et al

http://jncc.defra.gov.uk/pdf/JNCC_Guidelines_Piling%20protocol_August%202010.pdf

Acoustic deterrent devices
ORJIP phase I

https://www.carbontrust.com/media/394474/orjip-acoustic-deterrent-devices-phase-1-report-xodus.pdf

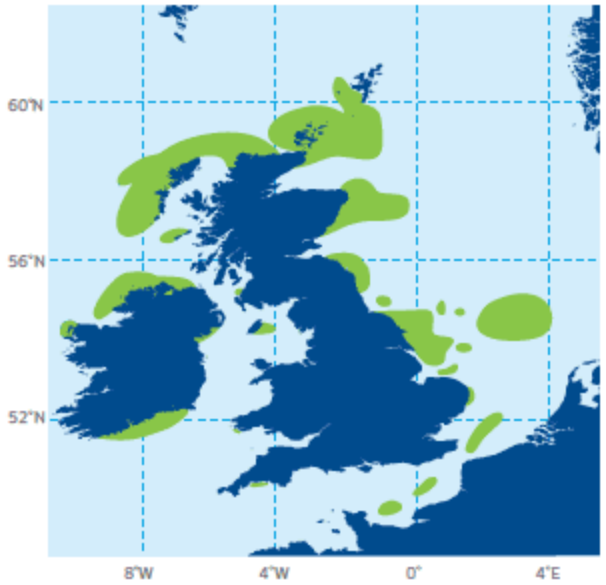
Acoustic deterrent devices
ORJIP phase II

1. Undertake fieldwork to test and monitor how effective minke whales are deterred by ADDs
2. Review the findings of the tests in terms of their effectiveness and how suitable they are as a method to mitigate injury to minke whale from piling noise
3. Provide recommendations on the use of ADDs in the offshore wind industry to inform government guidance on mitigating injury to marine mammals

	Harbour porpoise	*Grey seal*	*Harbour seal*	*Bottlenose dolphin*	*Minke whale*
Q1 Basic deterrence	✓	✓	✓	x	x
Q2 Deterrence in 'Offshore' environment	✓	x	x	x	x
Q3 Long term responses	x	x	x	x	x
Q4 Flexibility of effective range	x	x	x	x	x

Previous research on the response of deterrence devices on the five priority species

Reduce piling noise

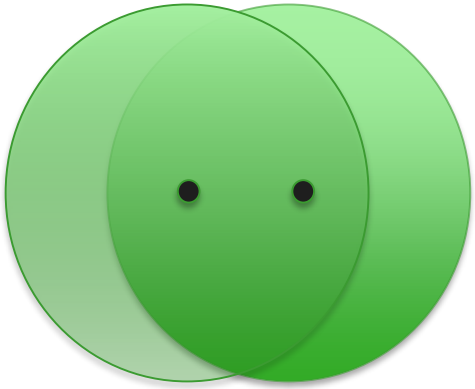


Seasonal restrictions on herring spawning grounds

In time

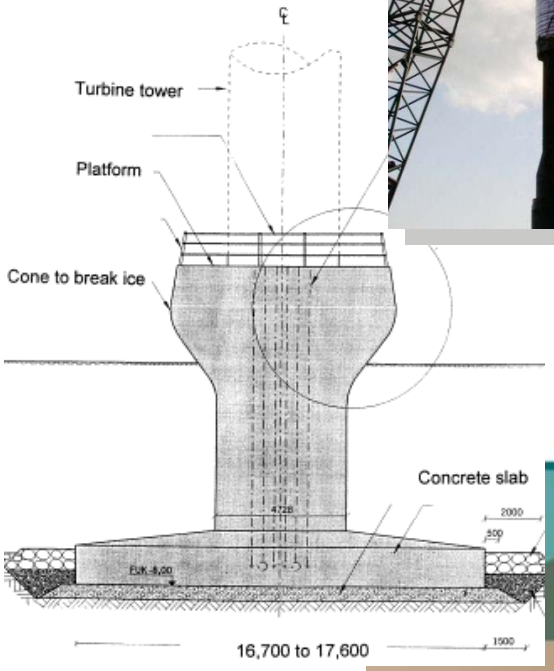
In space

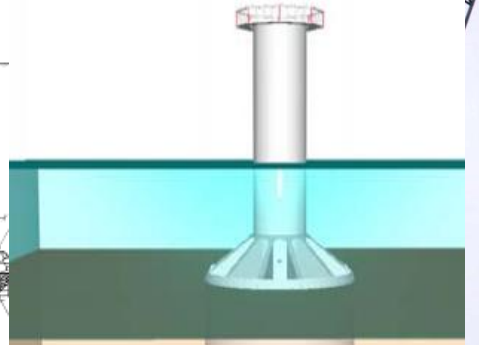
At source

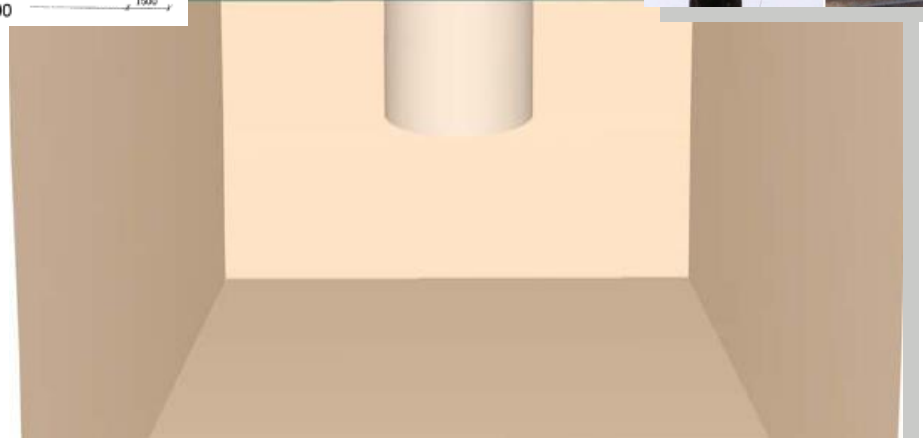


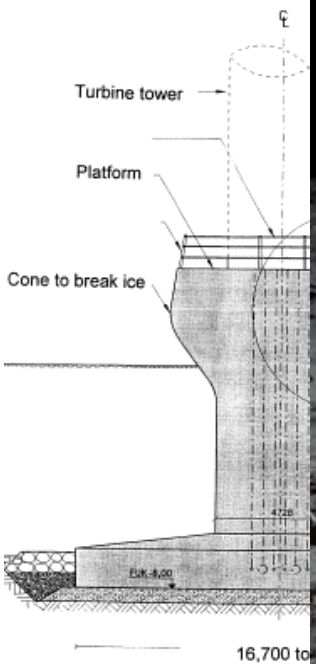
Concurrent piling

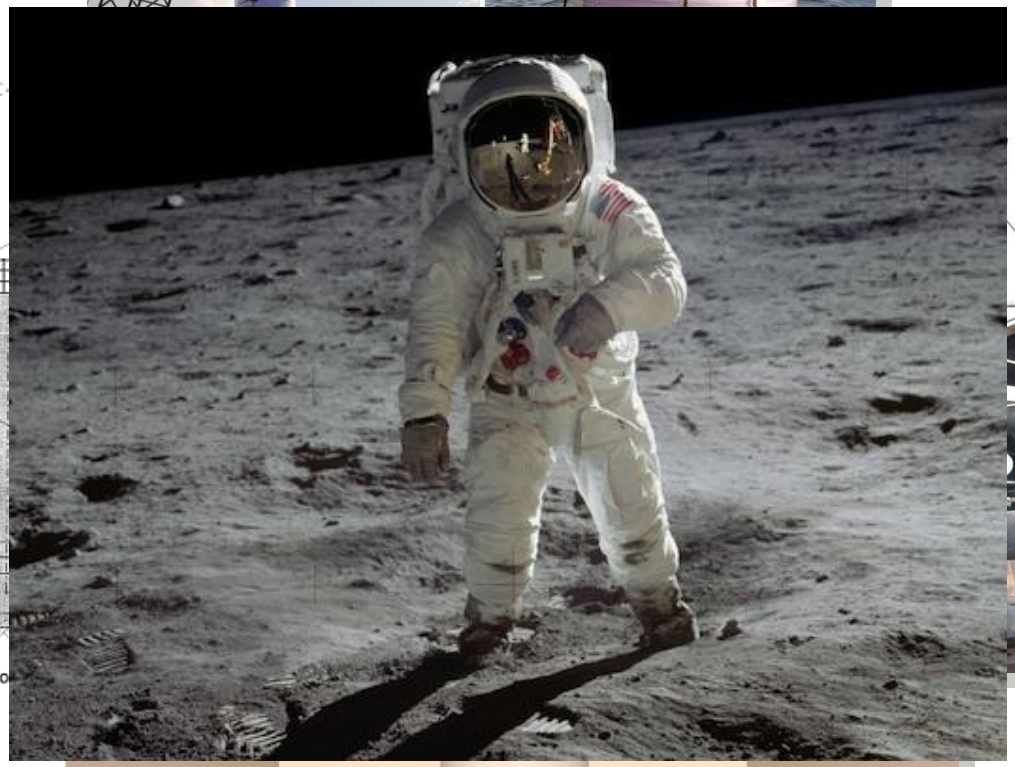
https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010005/EN010005-000735-121113%20EN010005%20MMO%20response%20to%20action%20number%20ISH%208.pdf

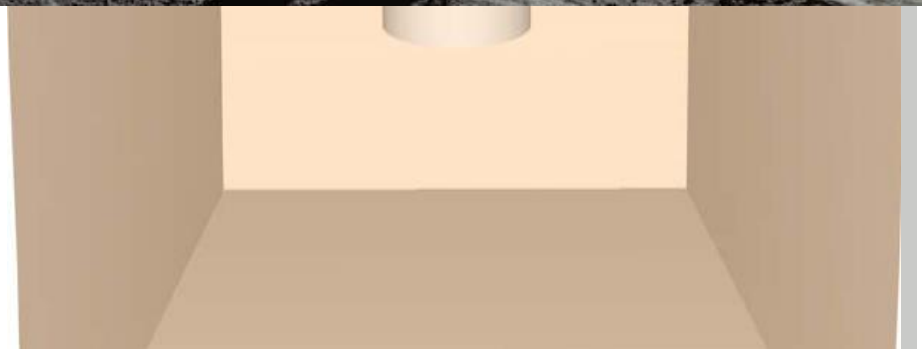

Turbine tower
Platform
Cone to break ice
Concrete slab
16,700 to 17,600






Turbine tower
Platform
Cone to break ice





CARBON TRUST

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News & Insights > 2017 > January > Carbon Trust launches ten...

Carbon Trust launches tenders for floating wind studies

https://www.carbontrust.com/news/2017/01/carbon-trust-launch-tenders-for-floating-wind-studies/

16 January 2017 | **News**

The Carbon Trust has launched a series of tenders to assess technology challenges associated with floating offshore wind.

No to uncertainty

But yes to flexibility

Mitigation coupled with monitoring its effectiveness

‘Operation of the Big Bubble curtain 2 reduced the potential area of disturbance by pile driving for harbour porpoises by 90%’. *Nehls et al. 2016*

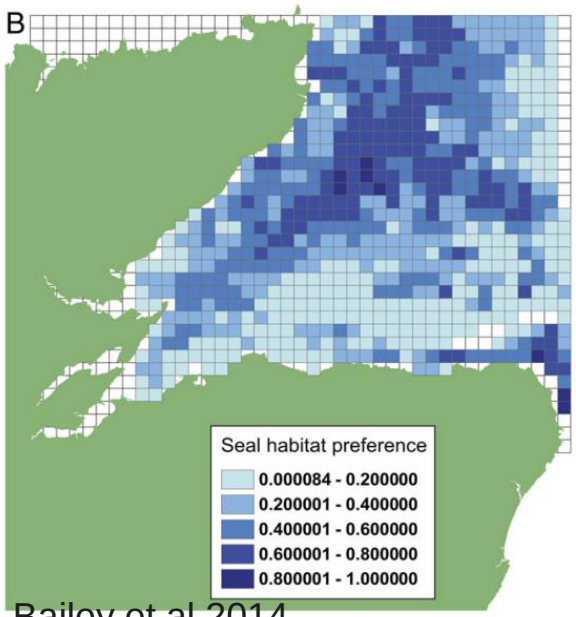

Planning
Assessment
Mitigation
Monitoring

Pre consent monitoring


Vodafone/SMRU

- Individual based studies of reproduction and survival
- Trends in abundance
- Distribution and foraging areas
- Long term time series


G.Burrows



Bailey et al 2014

Pre consent monitoring

Baseline Surveys

and/or

Site Characterisation Surveys

marinescotland
TOPIC SHEET NUMBER 126 V1

Scottish Government
Riaghaltas na h-Alba
gov.scot

THE EAST COAST MARINE MAMMAL ACOUSTIC STUDY (ECOMMAS)

FIGURE 1.
BOTTLENOSE DOLPHIN *TURSIOPS TRUNCATUS*
(COURTESY OF THE UNIVERSITY OF ABERDEEN)

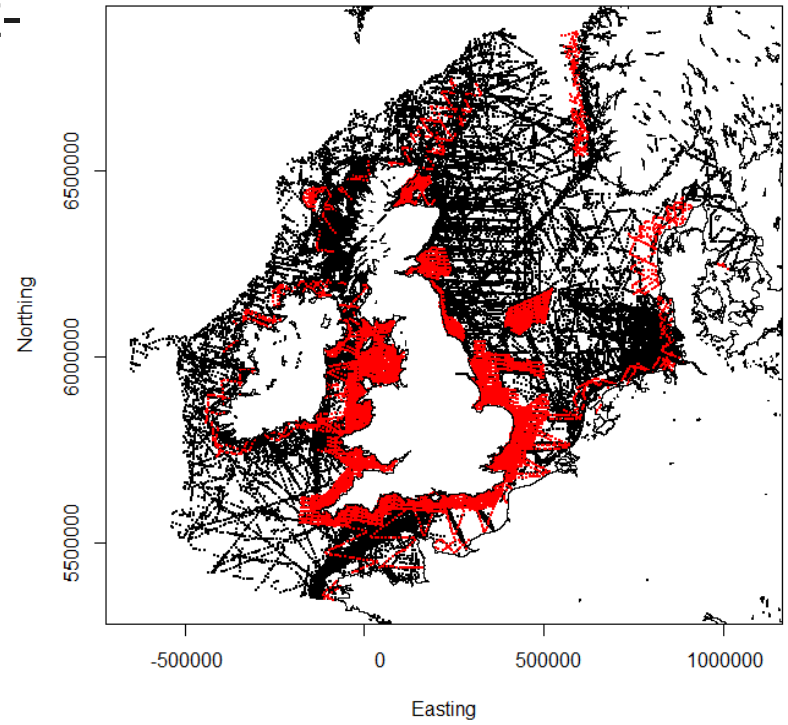
FIGURE 2.
HARBOUR PORPOISE *PHOCOENA PHOCOENA*
(COURTESY OF THE UNIVERSITY OF ABERDEEN)

FIGURE 3.
CHELONIA LTD'S CPOD WHICH RECORDS DOLPHIN AND PORPOISE ECHOLOCATION CLICKS

FIGURE 4.
WILDLIFE ACOUSTICS' SM2M MARINE RECORDER WHICH RECORDS UNDERWATER SOUNDS

Joint Cetacean Protocol

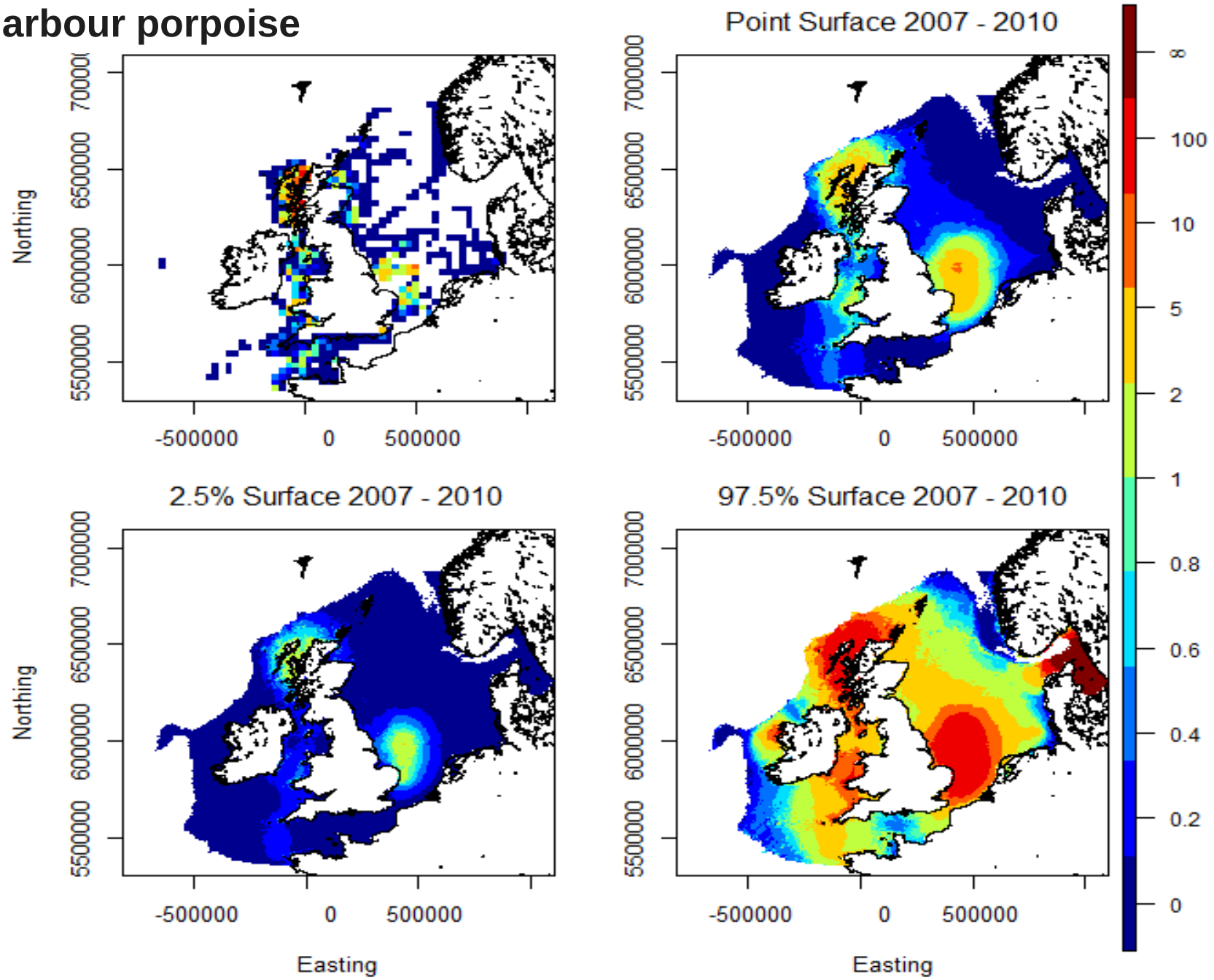
- Visual (and digital) at-sea effort-related data
- Dedicated and opportunistic surveys
- Data from 1980 – 2010
- Academic, NGO and industry sources
- 545 different survey platforms



EFFORT = 27 TIMES AROUND THE EQUATOR!

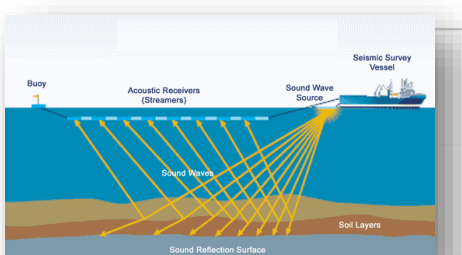
http://jncc.defra.gov.uk/page-5657

Harbour porpoise



UK Marine Noise Registry

Joint Nature Conservation Committee



Total Pulse Block Day Map (January - December 2015)

Legend

Oil and Gas Block

UK Continental Shelf

MSFD sub-regions

Pulse-block-day

1

2-5

6-10

11-20

21-30

31-40

41-50

51-100

101-200

201-365

Celtic Seas

Greater North Sea

52

-20

-15

-10

-5

0

Longitude

0km 100km 200km

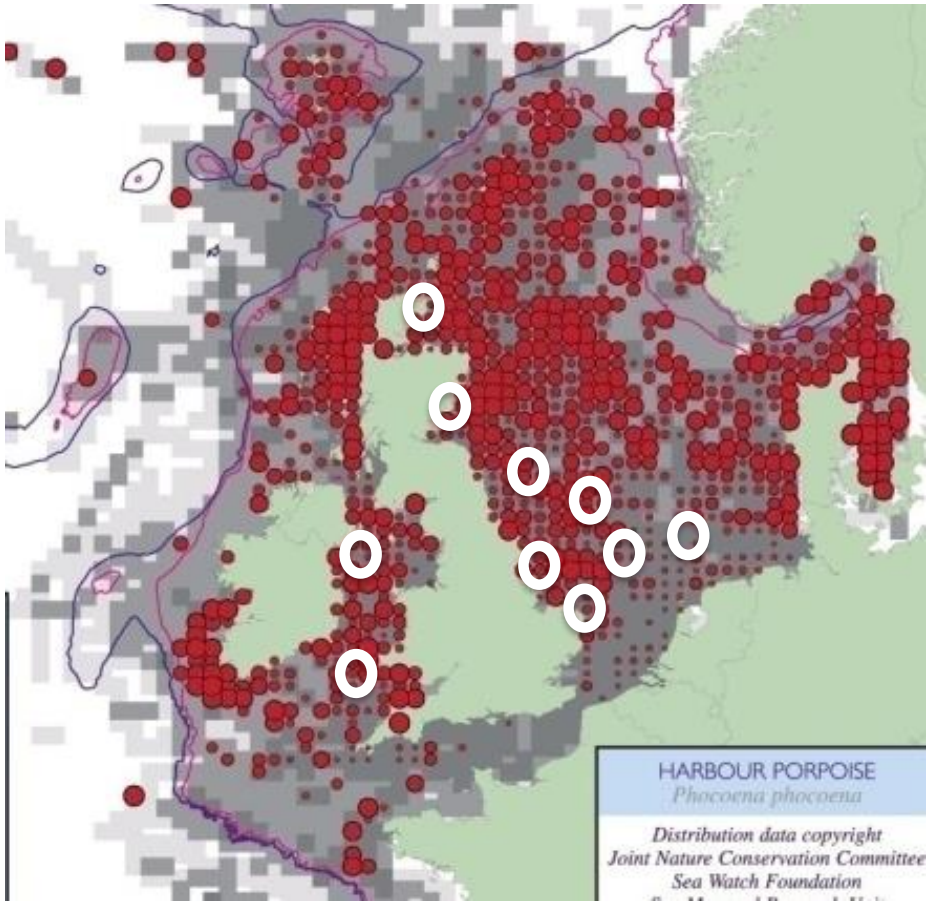
http://jncc.defra.gov.uk/page-7070

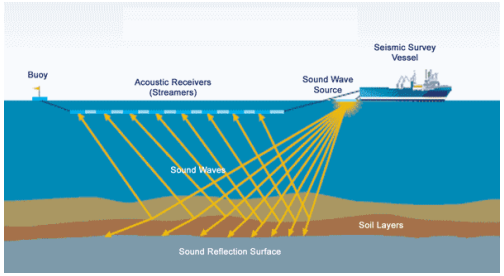
Post consent monitoring/research

- Consent conditions
- Well justified
- Validate predictions in environmental impact assessment
- Before During After - Gradient
- Is it monitoring and/or research?
- When and where is this valuable
- Nice to know vs need to know
- Provide evidence on the effectiveness of mitigation measures

Cumulative effects

Cumulative/in combination effects

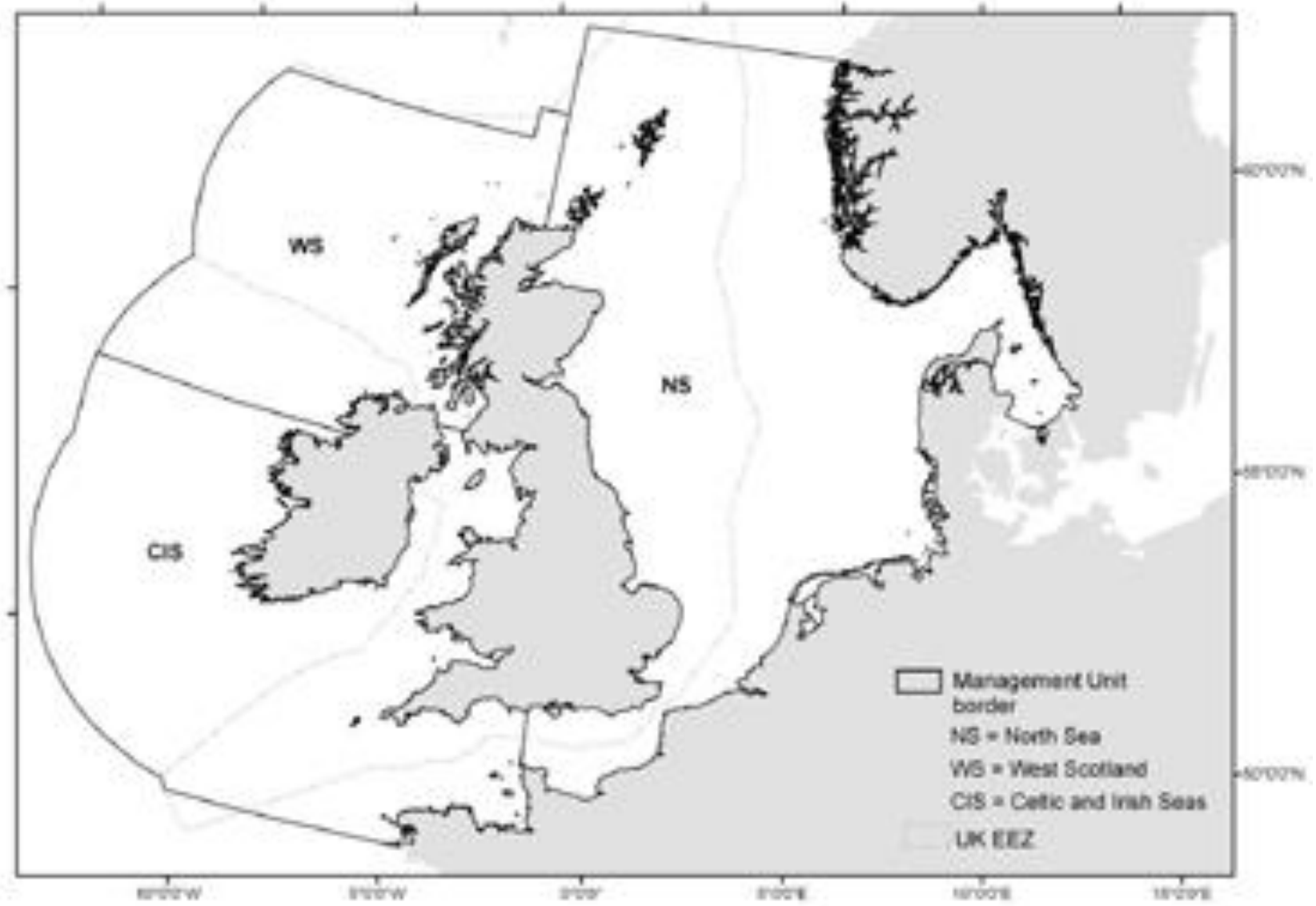




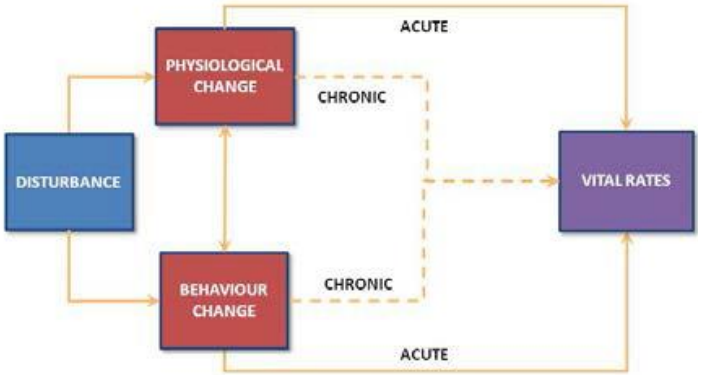
Developing a CEA framework?

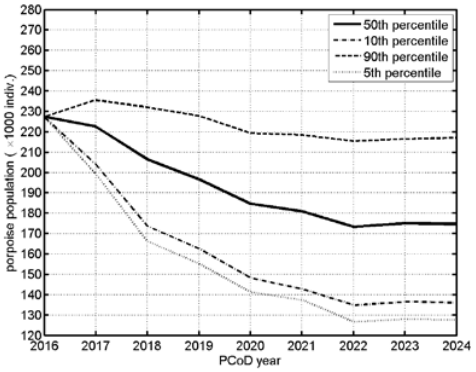
1. Transboundary data collation and sharing (protocols and standards)
2. Incorporating different pressures (e.g. other industries, climate change)
3. Reference populations
4. Population level modelling approaches
5. Thresholds for acceptable change
6. Uncertainties and evidence gaps
7. Accounting of impact/recording data and metadata
8. Associated conservation/mitigation measures

Harbour porpoise **Reference Populations**, IAMMWG 2015

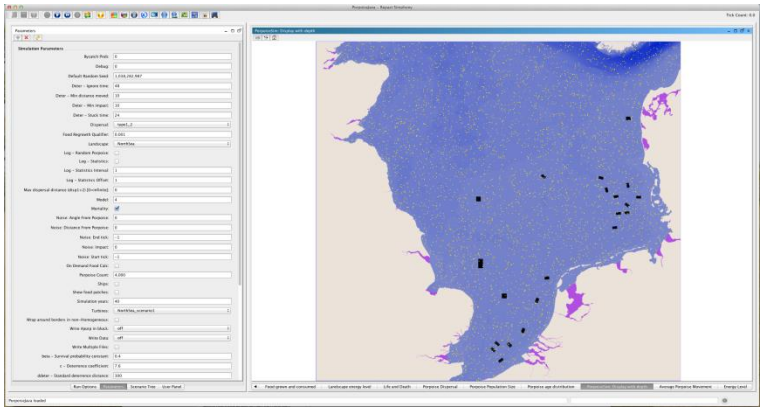


Interim PcoD –Population Consequences of Disturbance





DEPONS – Disturbance Effects on the Harbour Porpoise Population in the North Sea



- Uncertainties and evidence gaps
- Parameter sensitivity analyses

Lessons learned I

Joint Nature Conservation Committee

- Carefully sited and designed wind farms
- Collaborative research initiatives between industry and government to reduce uncertainty
- Proactive measures to reduce noise
- Guidance

- Siting wind farms whilst ignoring environmental sensitivities
- How much you can get away with…
- Dithering

Lessons learned II

Joint Nature Conservation Committee

- Well justified monitoring and research, validate predictions
- Power to detect change
- Collaborative surveys and data collection and collation
- Monitoring Standards
- Before **During** After impact – Gradient approach
- Monitoring mitigation effectiveness and practicality
- Regulatory driver for mitigation

- Ignoring scale
- Ignoring cumulative effects
- Cherry picking the evidence

Thank you for listening

sonia.mendes@jncc.gov.uk

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