



ASCOBANS, 26th meeting of the Advisory Committee, 8-12 November 2021

Status quo on ocean energy in the Agreement area

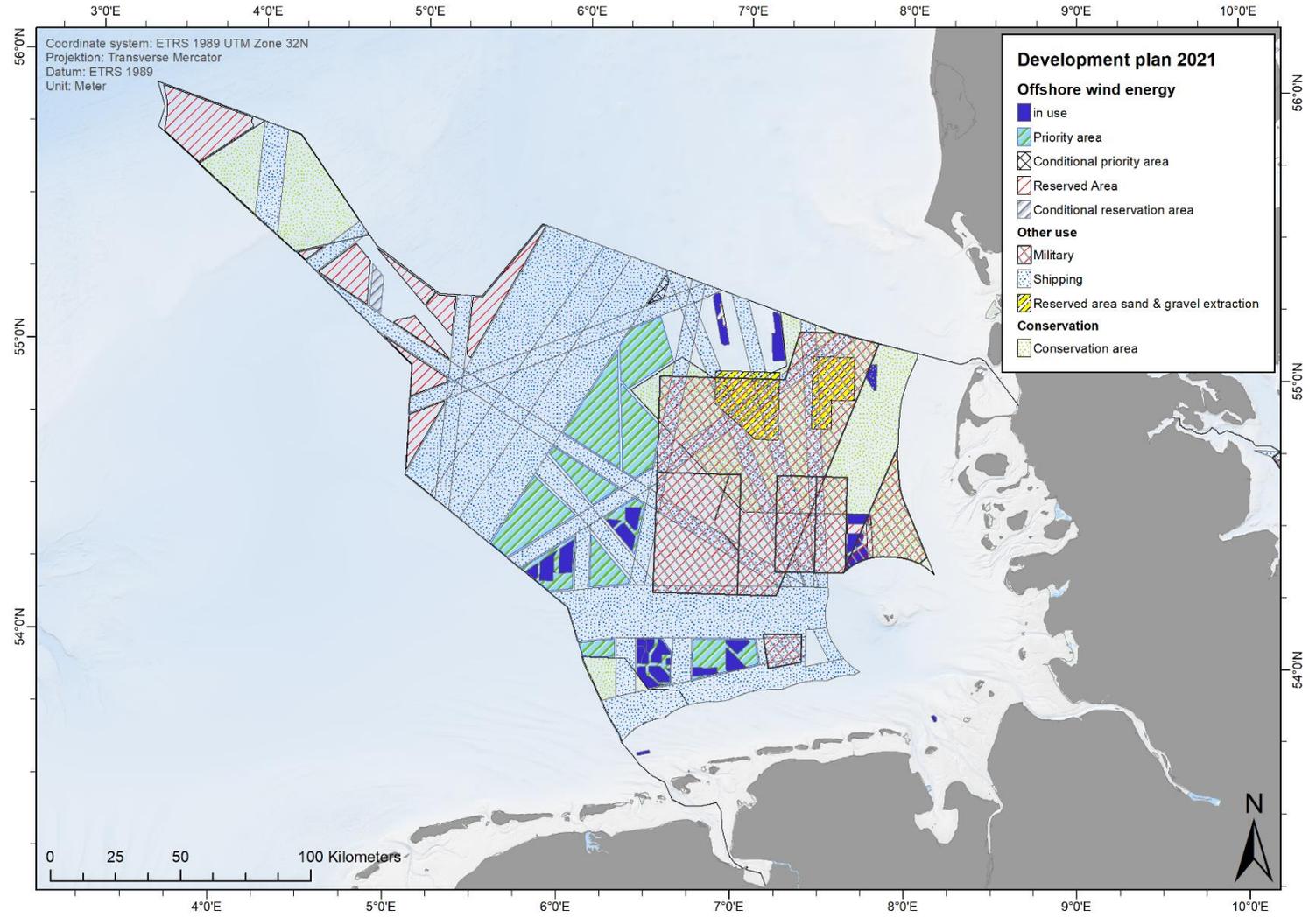
Dr. Tobias Schaffeld, Prof. Prof. h.c. Dr. Ursula Siebert

Institute for Terrestrial and Aquatic Wildlife Research,
Büsum, Germany

tobias.schaffeld@tiho-hannover.de

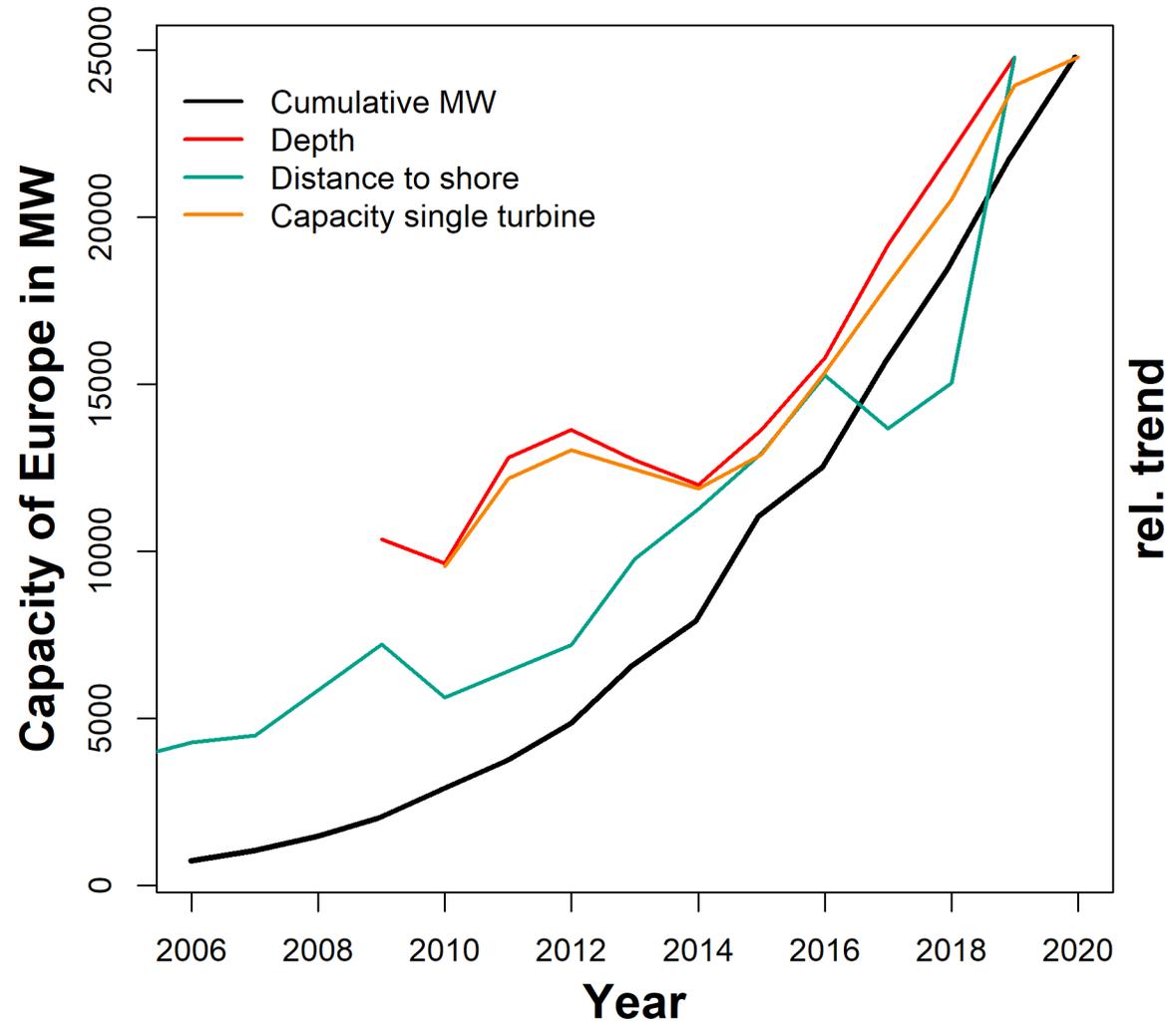


Current status



Data from EMODnet, map by Abbo van Neer

Current status

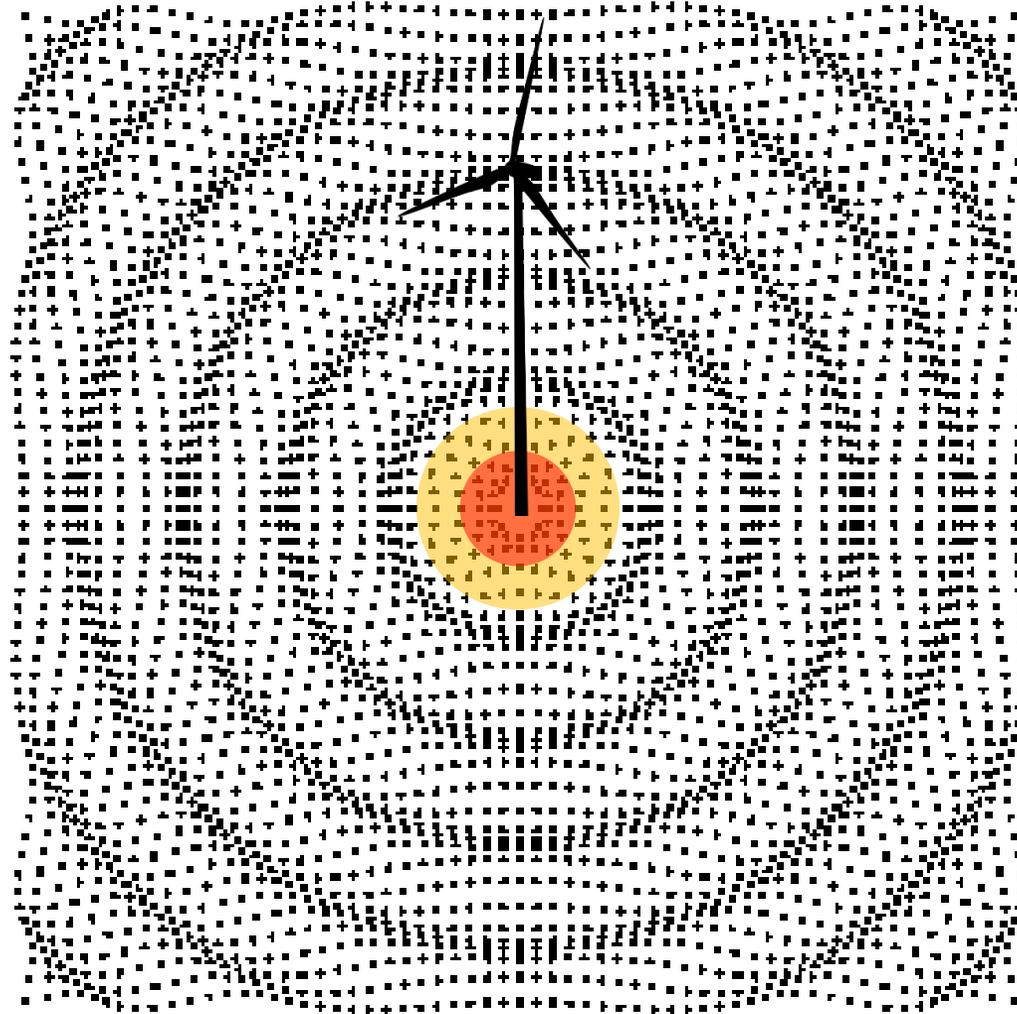


Data adopted from www.windeurope.org

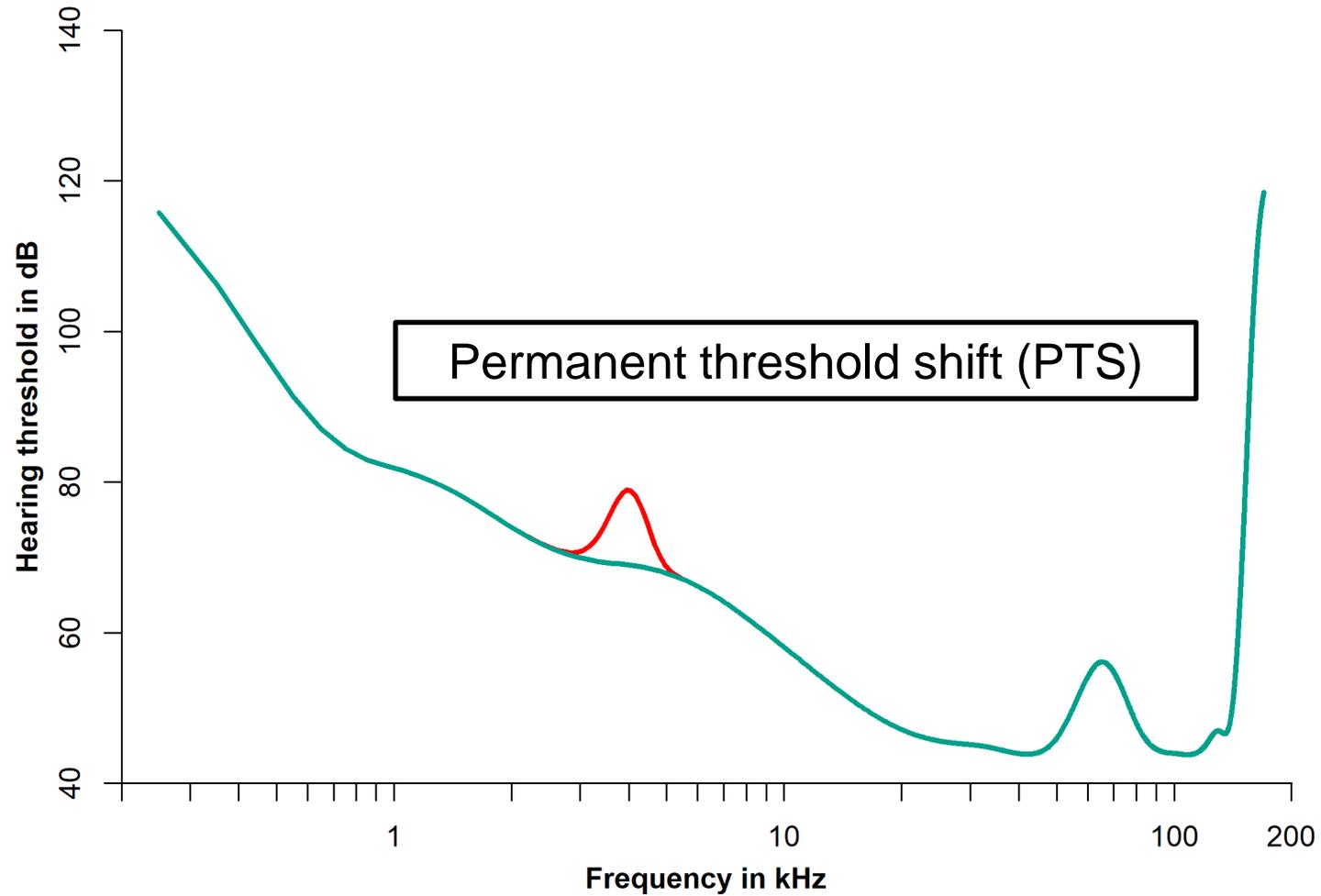
Key issues of pile driving

Lethal injuries

Hearing impairment

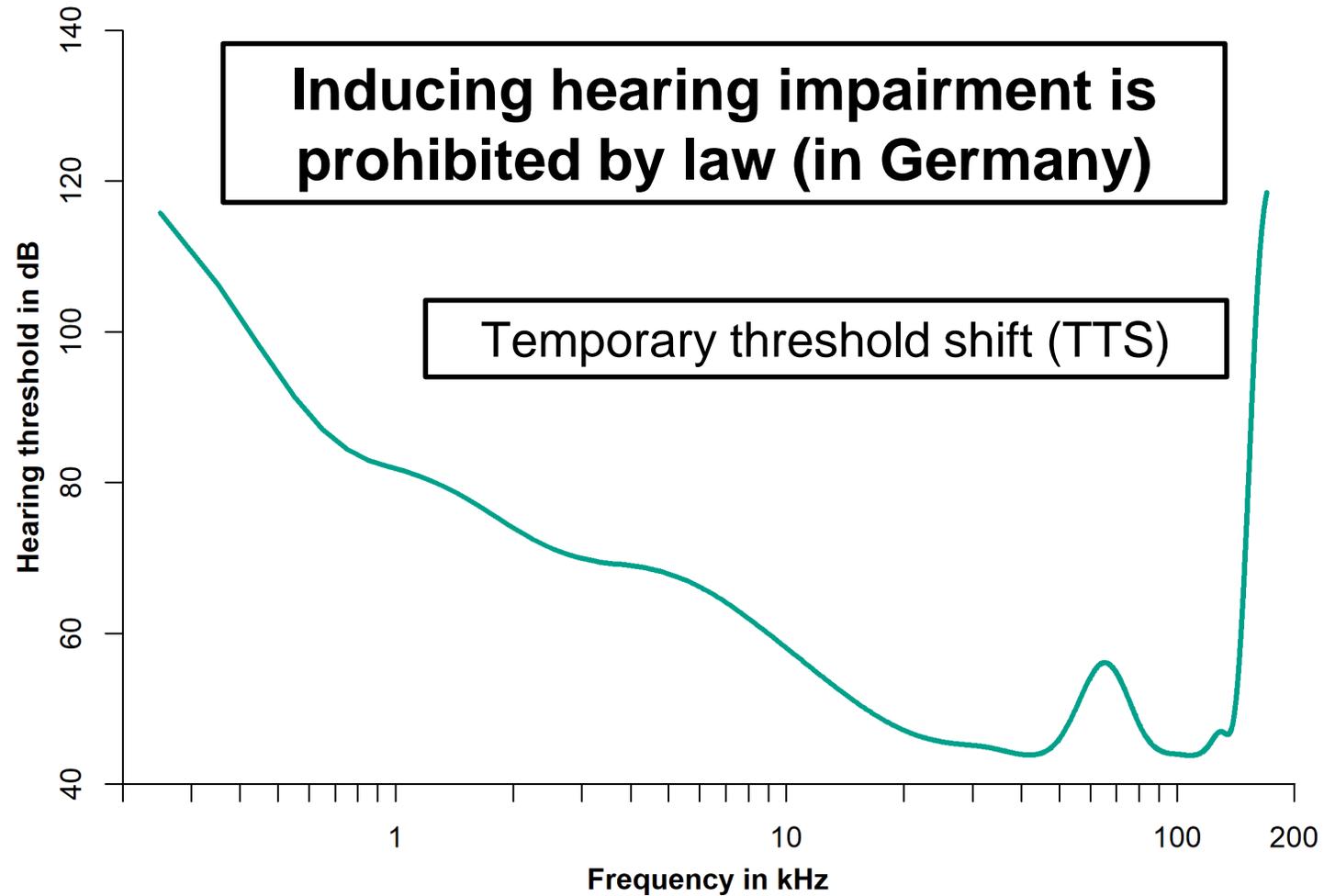


Key issues of pile driving



Audiogram adopted from Kastelein et al. (2002)

Key issues of pile driving



Audiogram adopted from Kastelein et al. (2002)

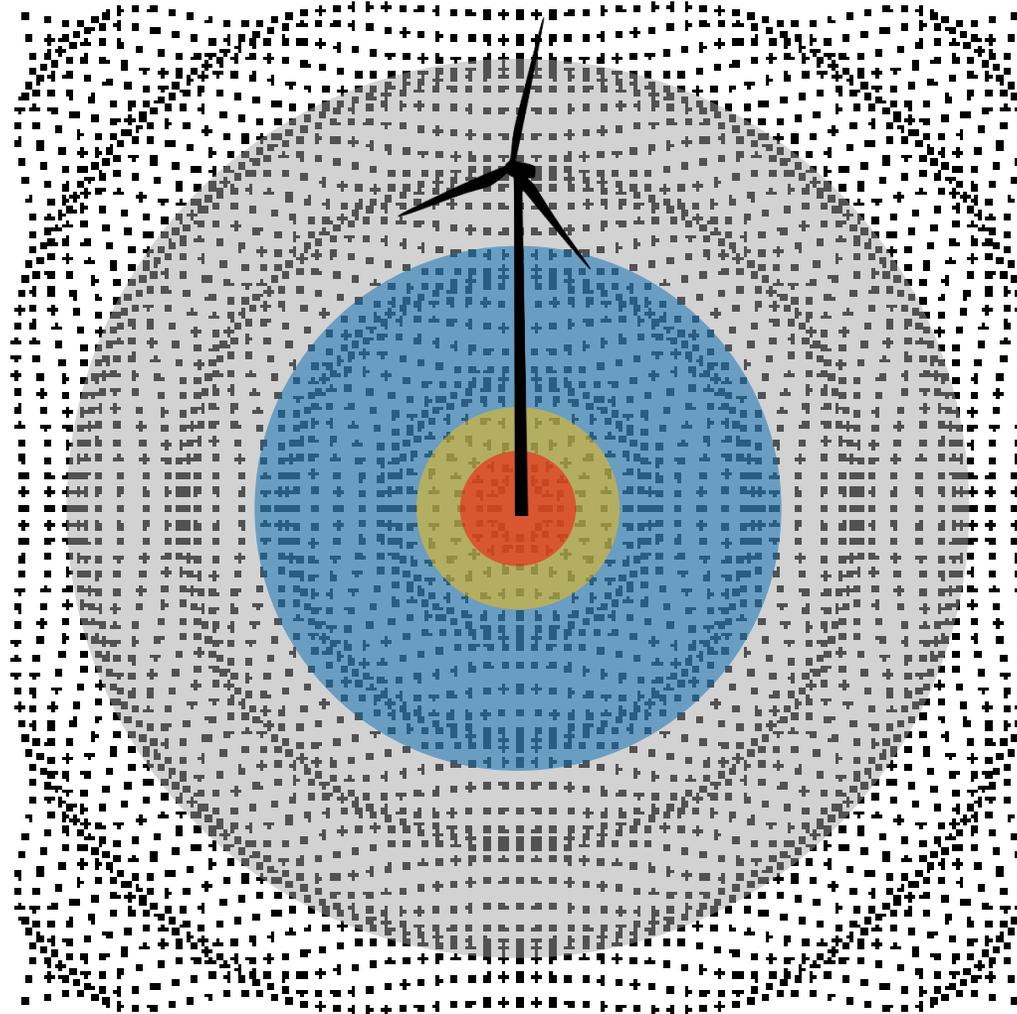
Key issues of pile driving

Lethal injuries

Hearing impairment

Behavioural reactions

Masking

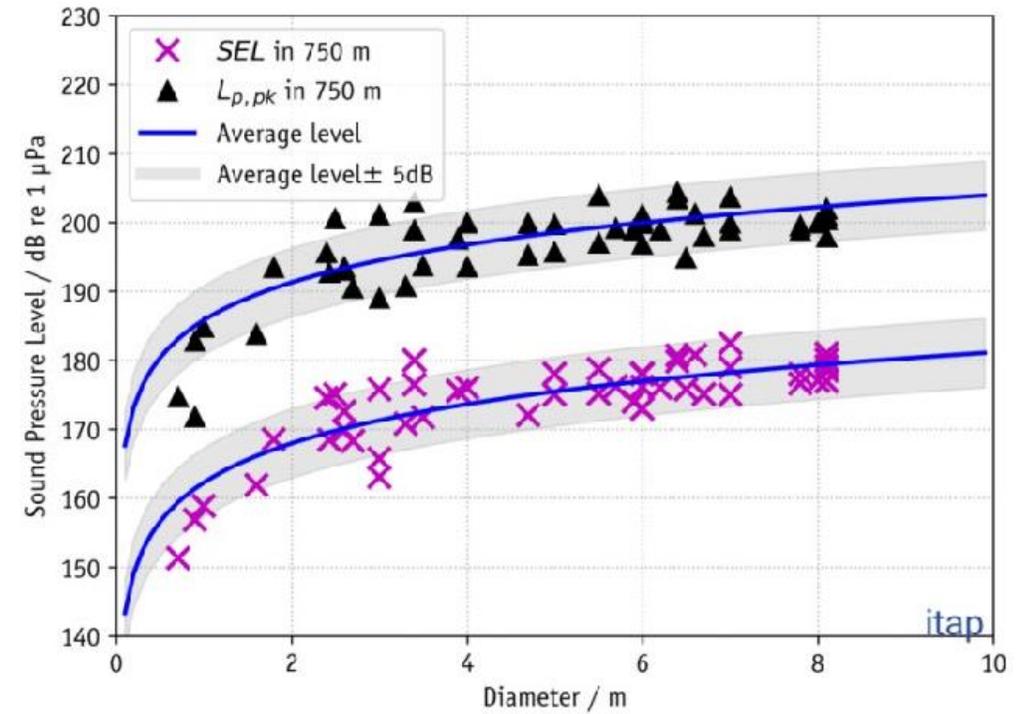


Mitigation measures

Big Bubble Curtain



Hydrotechnik Lübeck



Bellmann et al. (2018)

Not suitable for deeper waters

Mitigation measures

Isolation casings



Ørsted

Hydro sound damper



OffNoise-Solutions

Vibrating pile drivers



<https://www.delta.tudelft.nl>

Technological developments

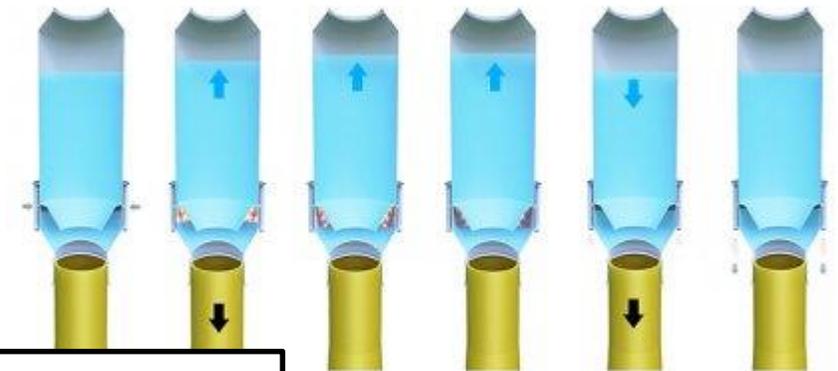
Pulse prolongation by adaptation of hydraulic hammers



IQIP, YouTube

Ecological effect of pulse prolongation unknown

BLUE piling



<https://www.windpowerengineering.com/>

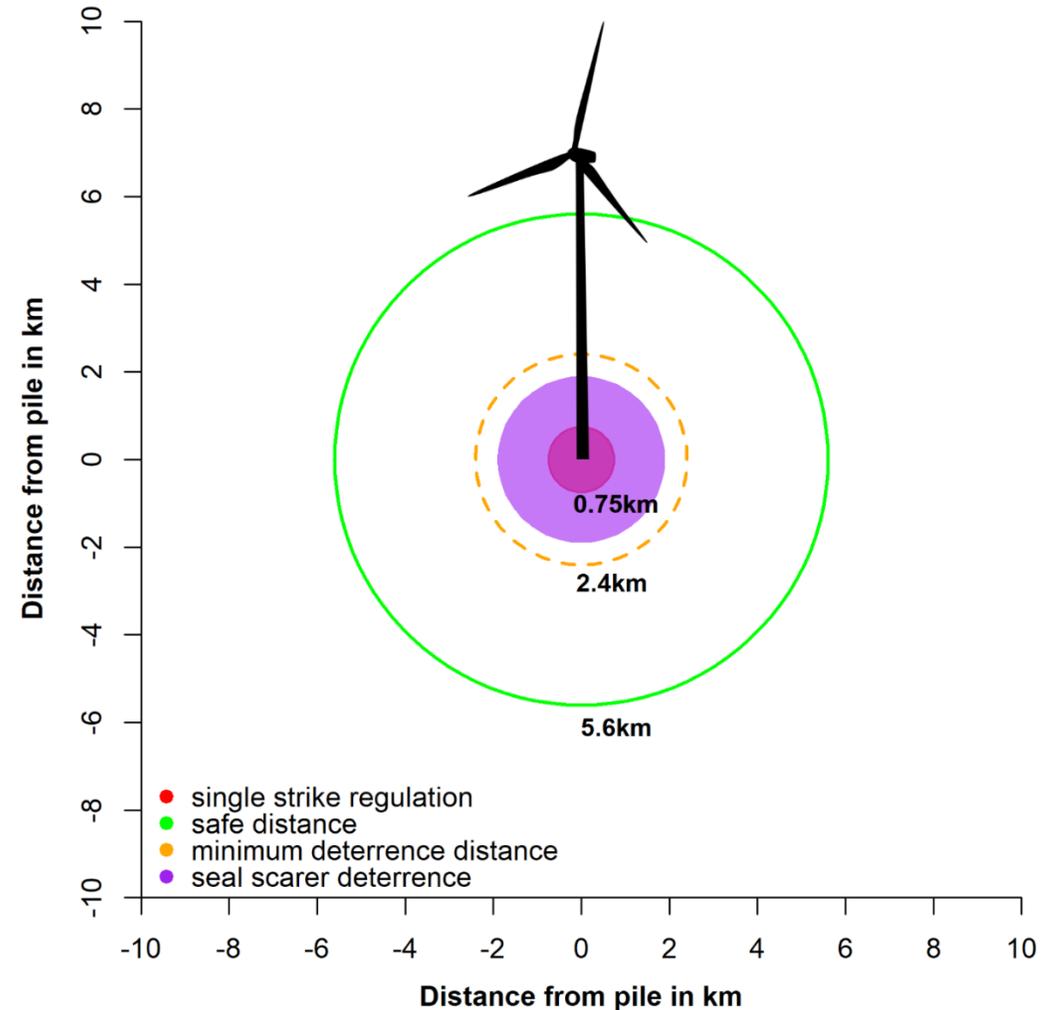
Best practices and guidelines

Single strikes above 164 dB can induce a TTS
(Lucke et al. 2009)

Multiple strikes of 145 dB can induce a TTS, if
cumulative energy exceeds 175 dB
(Kastelein et al. 2016)

Previous deterrence up to minimum
deterrence distance
(Schaffeld et al. 2020)

Previous deterrence already implemented in
noise mitigation concept in Germany.
(Schaffeld et al. 2019)



Best practices and guidelines

Single strikes above 164 dB can induce a TTS
(Lucke et al. 2009)

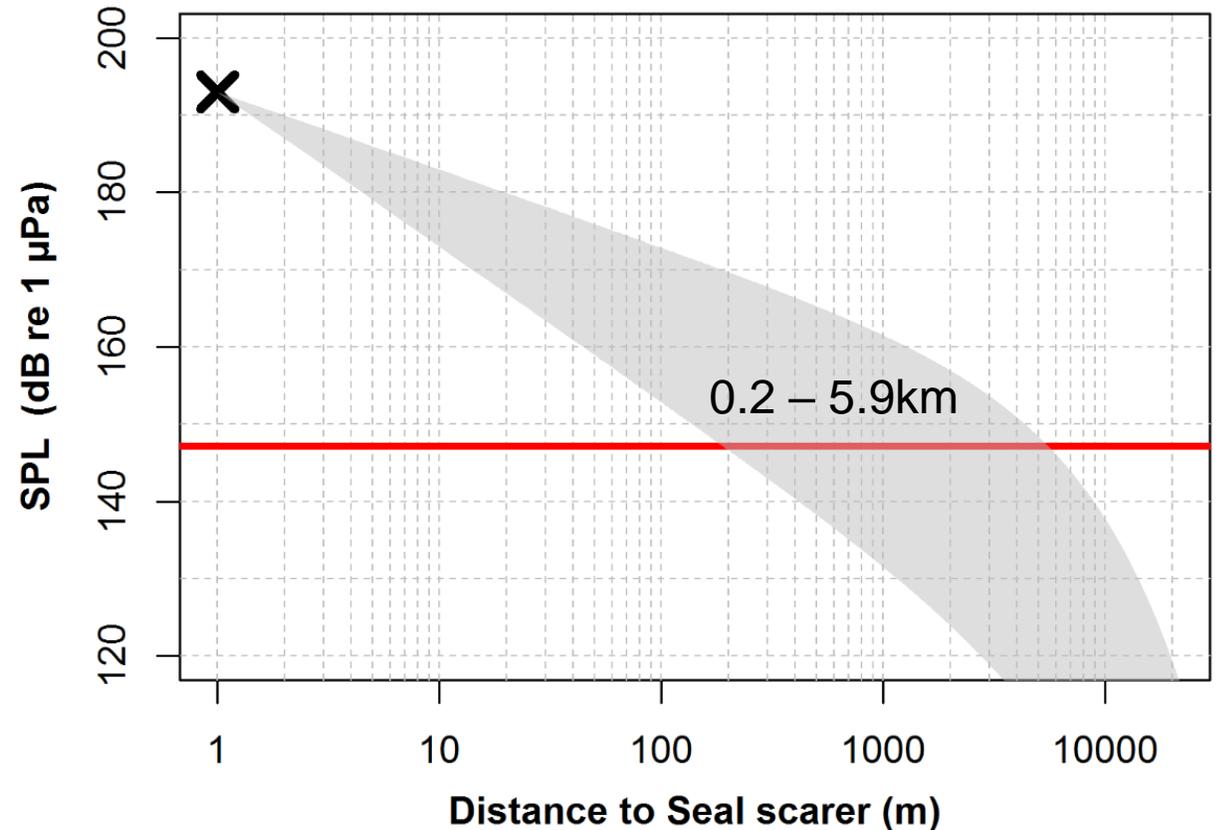
Multiple strikes of 145 dB can induce a TTS, if
cumulative energy exceeds 175 dB
(Kastelein et al. 2016)

Previous deterrence up to minimum
deterrence distance
(Schaffeld et al. 2020)

Previous deterrence already implemented in
noise mitigation concept in Germany.
(Schaffeld et al. 2019)

Slowly increase seal scarer energy and give
porpoises time to flee
(Schaffeld et al. 2019)

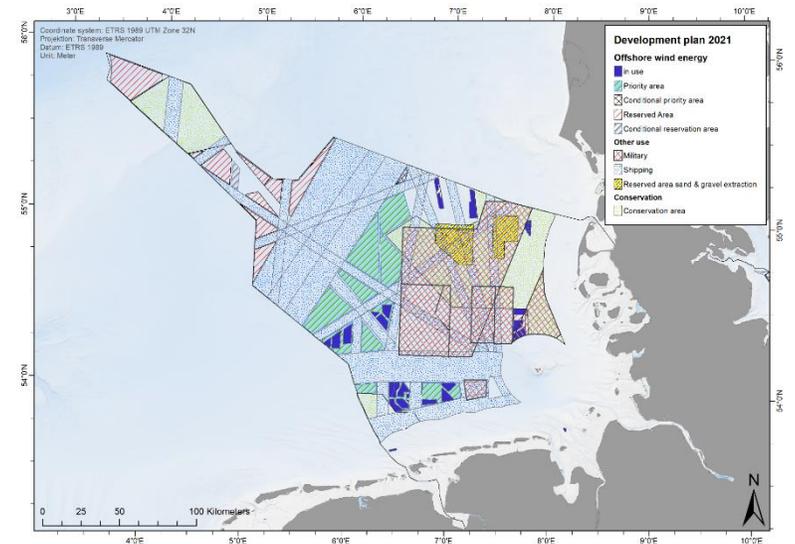
Seal scarers can induce a TTS



Action points

Monitoring of population trends across countries

“strong decline in the core area and main reproduction site in summer, the SAC Sylt Outer Reef (-3.79% per year).” (Nachtsheim et al. 2021)

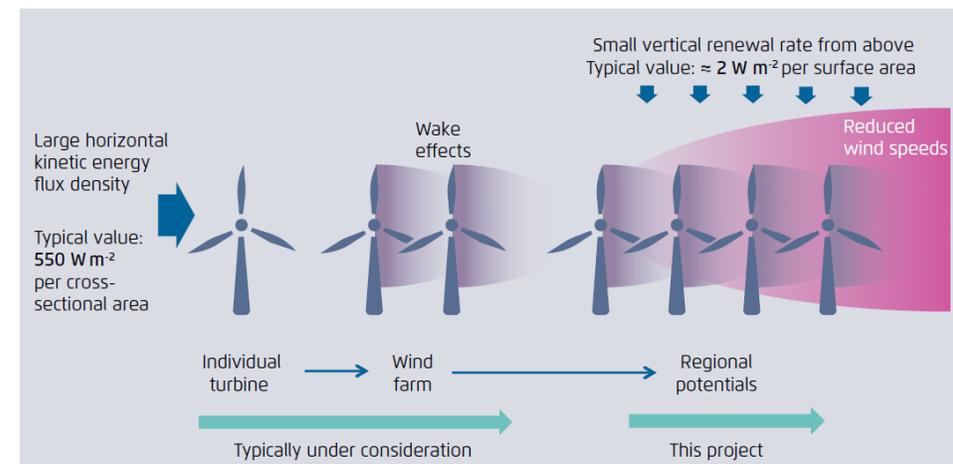


Effects of construction of multiple wind farms at the same time unknown

Action points

Monitoring of population trends across countries

Consideration of kinetic energy from atmospheric flow



Agora Energiewende, Agora Verkehrswende, Technical University of Denmark and Max-Planck-Institute for Biogeochemistry (2020): Making the Most of Offshore Wind: Re-Evaluating the Potential of Offshore Wind in the German North Sea.

Action points

Monitoring of population trends across countries

Consideration of kinetic energy from atmospheric flow

Regulation of actions after operation phase



Operation phase between 20-25 years.
Dismantling suggested if action is justifiable for habitat

Action points

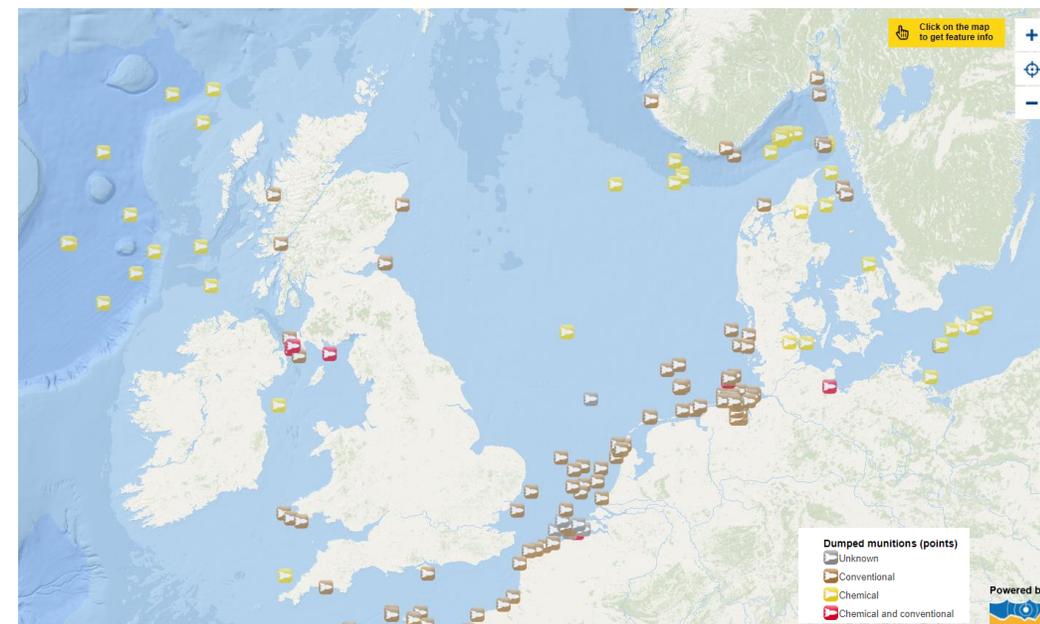
Monitoring of population trends across countries

Consideration of kinetic energy from atmospheric flow

Regulation of actions after operation phase

Regulation for clearance of unexploded ammunition of World War II

1,600,000 registered munition parts in German North Sea and 800,000 in German Baltic Sea



Blast injuries found in stranded harbor porpoises (*Siebert et al. under review*)

Acknowledgements

Funding agencies:



References:

Koschinski & Lüdemann (2020). Noise mitigation for the construction of increasingly large offshore wind turbines (Report).

Wind Europe (2019). Offshore Wind in Europe – Key Trends and statistics 2019 (Report).

Wind Europe (2020). Offshore Wind in Europe – Key Trends and statistics 2020 (Report).

Agora Energiewende, Agora Verkehrswende, Technical University of Denmark and Max-Planck-Institute for Biogeochemistry (2020): Making the Most of Offshore Wind: Re-Evaluating the Potential of Offshore Wind in the German North Sea.

Thank you for your attention!