



Ministry of Infrastructure  
and Water Management

## Marine mammals and underwater sound

Wozep tussenstandbijeenkomst  
14 February 2023

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Source: Ecomare/Salko de Wolf Den Hoorn Texel



Source: VanOord b.v., Rotterdam



# North Sea marine mammals



Harbour seal



Dwarf minke whale



Harbour porpoise



Grey seal



Common dolphin

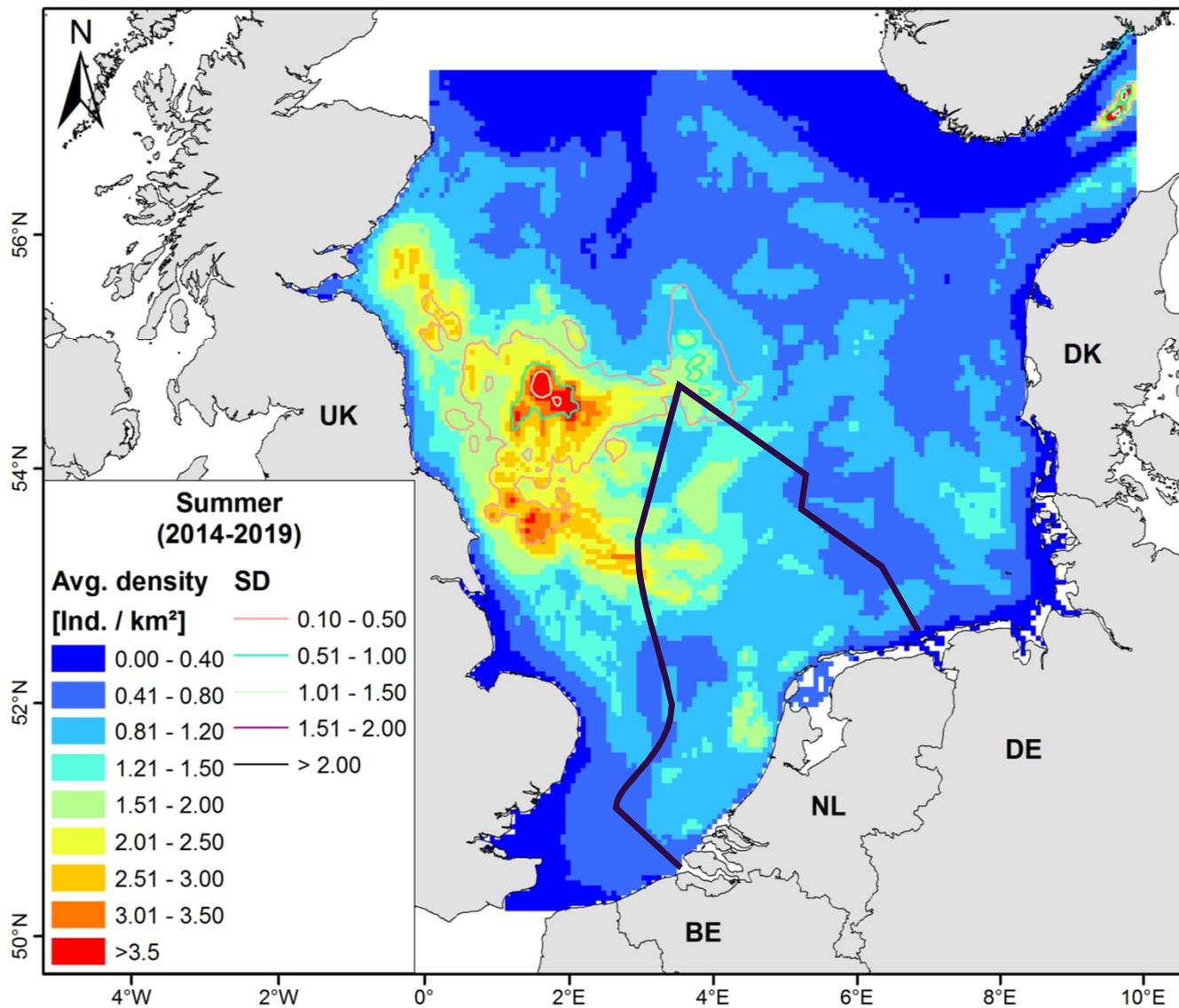


Bottlenose dolphin



White-beaked dolphin

All images: Wikipedia



Map: Gilles (2020)

# Harbour porpoise North Sea

Estimated population (KEC4.0)

North Sea: ~ 370 000

Dutch part: ~ 63 000



Source: Ecomare/Salko de Wolf Den Hoorn Texel



# Wind at Sea Ecological Programme

- › Governmentally funded programme
- › Direct and indirect effects 'wind at sea' (beyond 2030)
- › Effects of mitigation
- › Knowledge on ecological effects
- › Reduce uncertainties
  - Ecological
  - Financial





# Construction

- › Piling

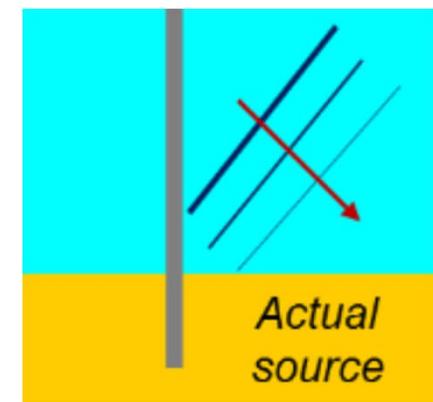
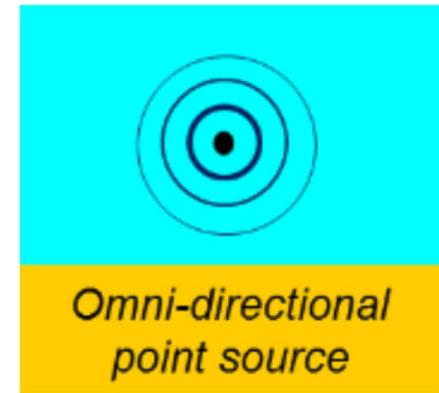


Source: VanOord b.v., Rotterdam



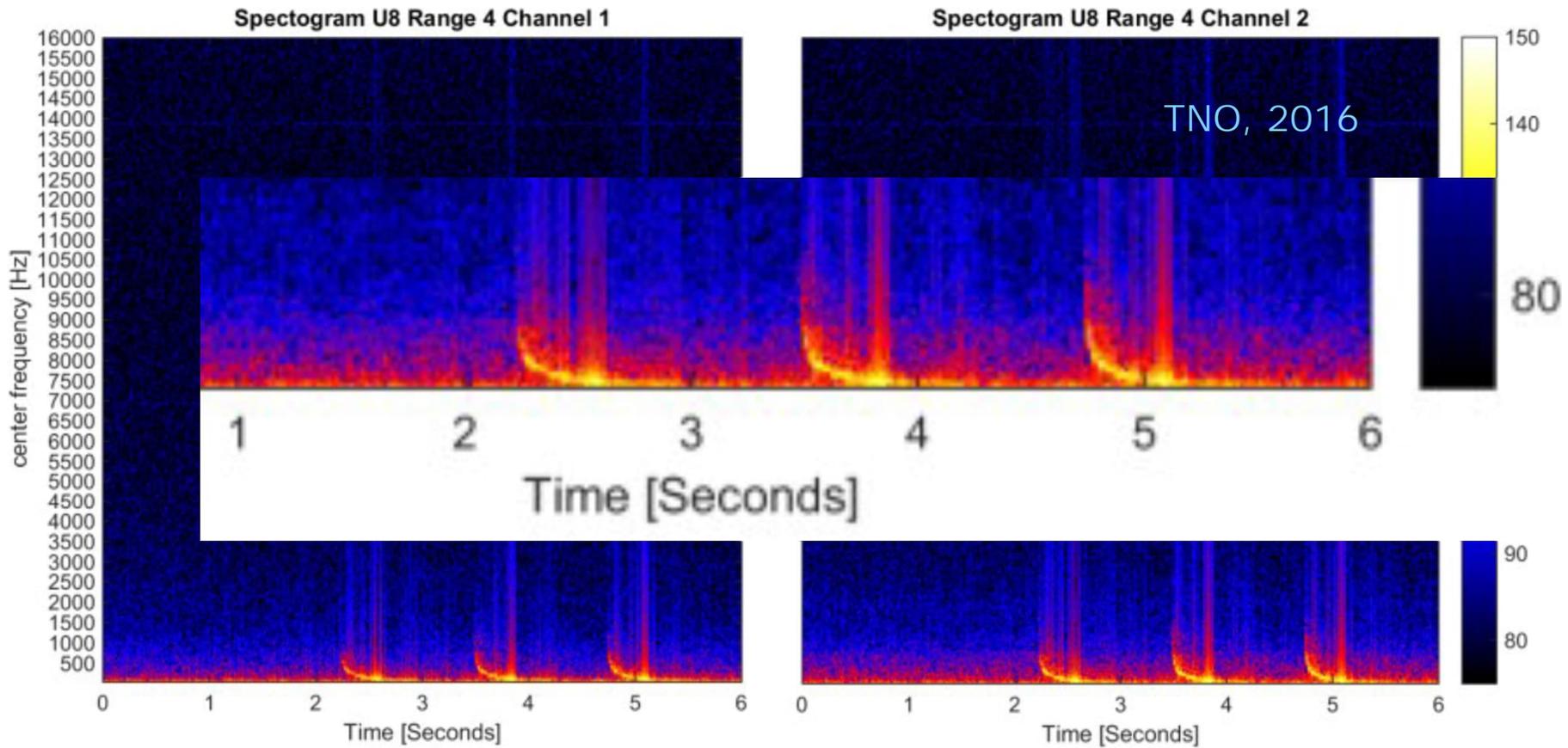
# Construction

- > Piling
- > Source description





# Construction



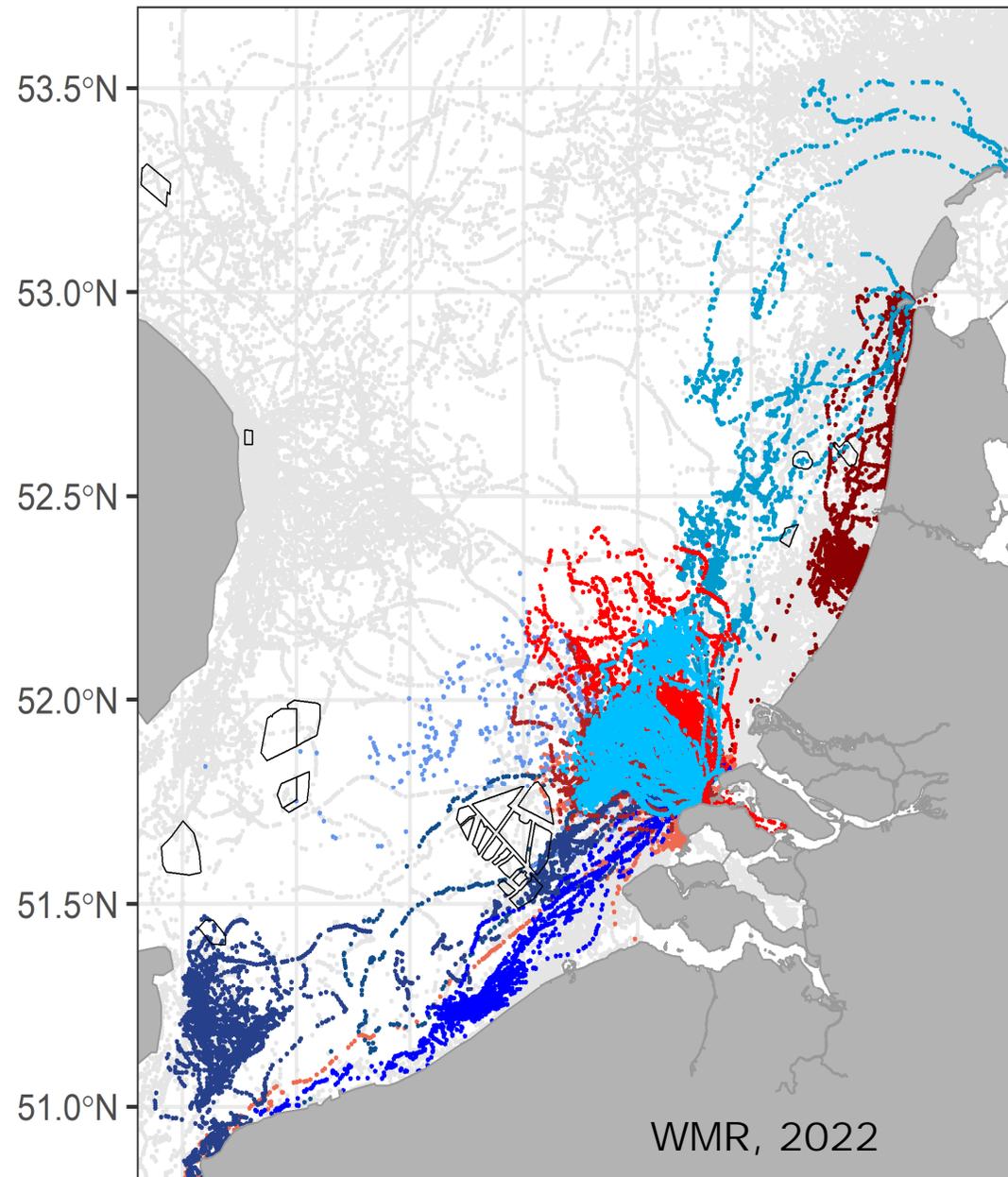


# Construction

- › Piling
  
- › Source description
- › Sound propagation
  
- › Future construction techniques
  - Vibro piling
  - Blue piling
  - other

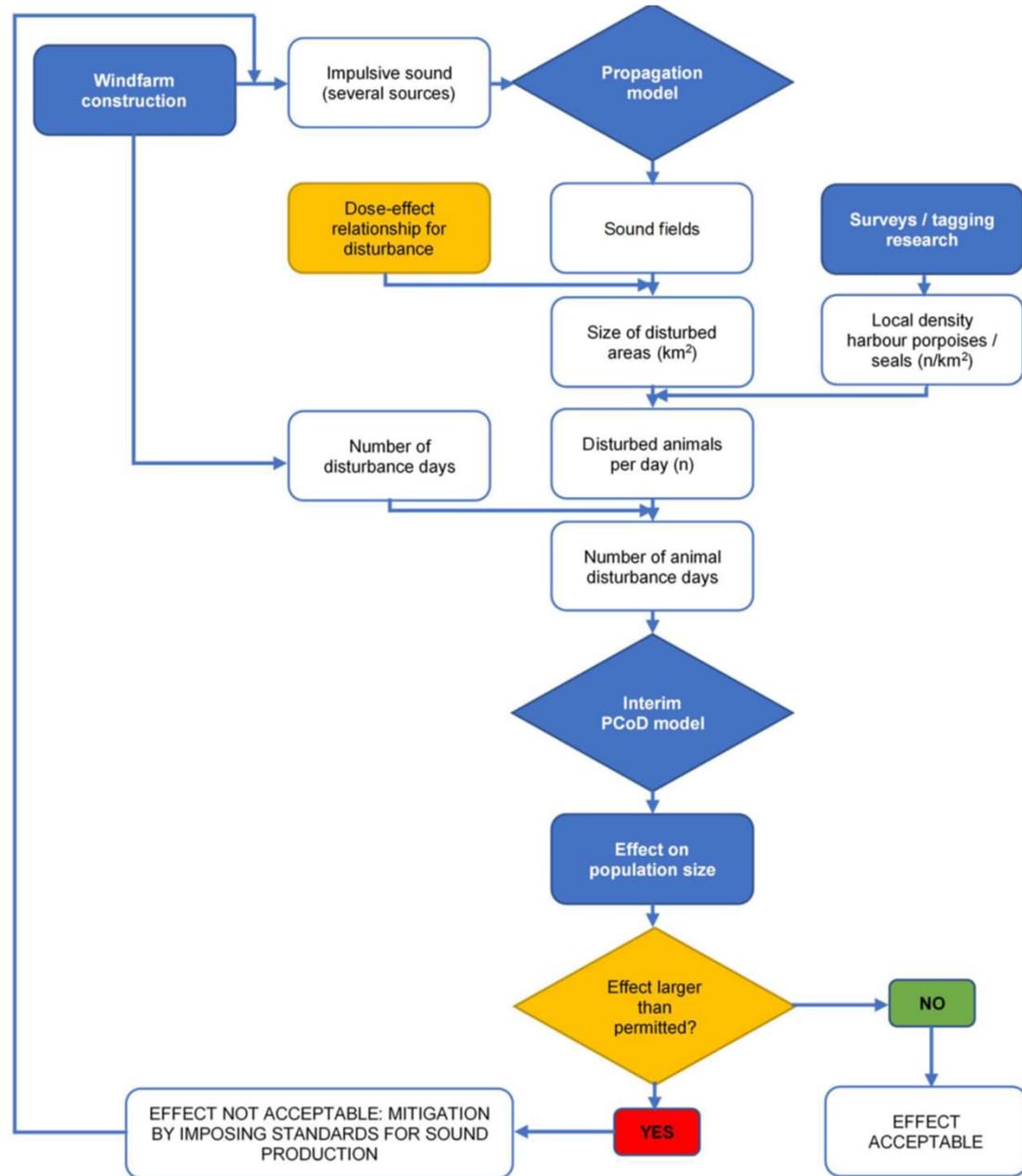
# Construction

- › Piling
- › Injury (PTS & TTS)
- › Displacement
  - Example grey seal
- › Habitat loss
  - Temporary?
  - Permanent?



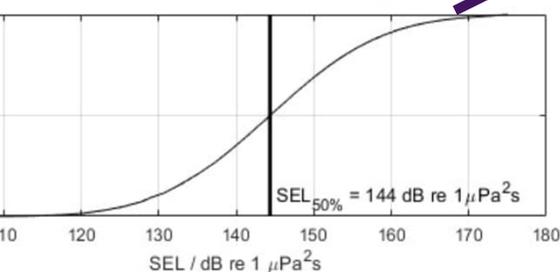
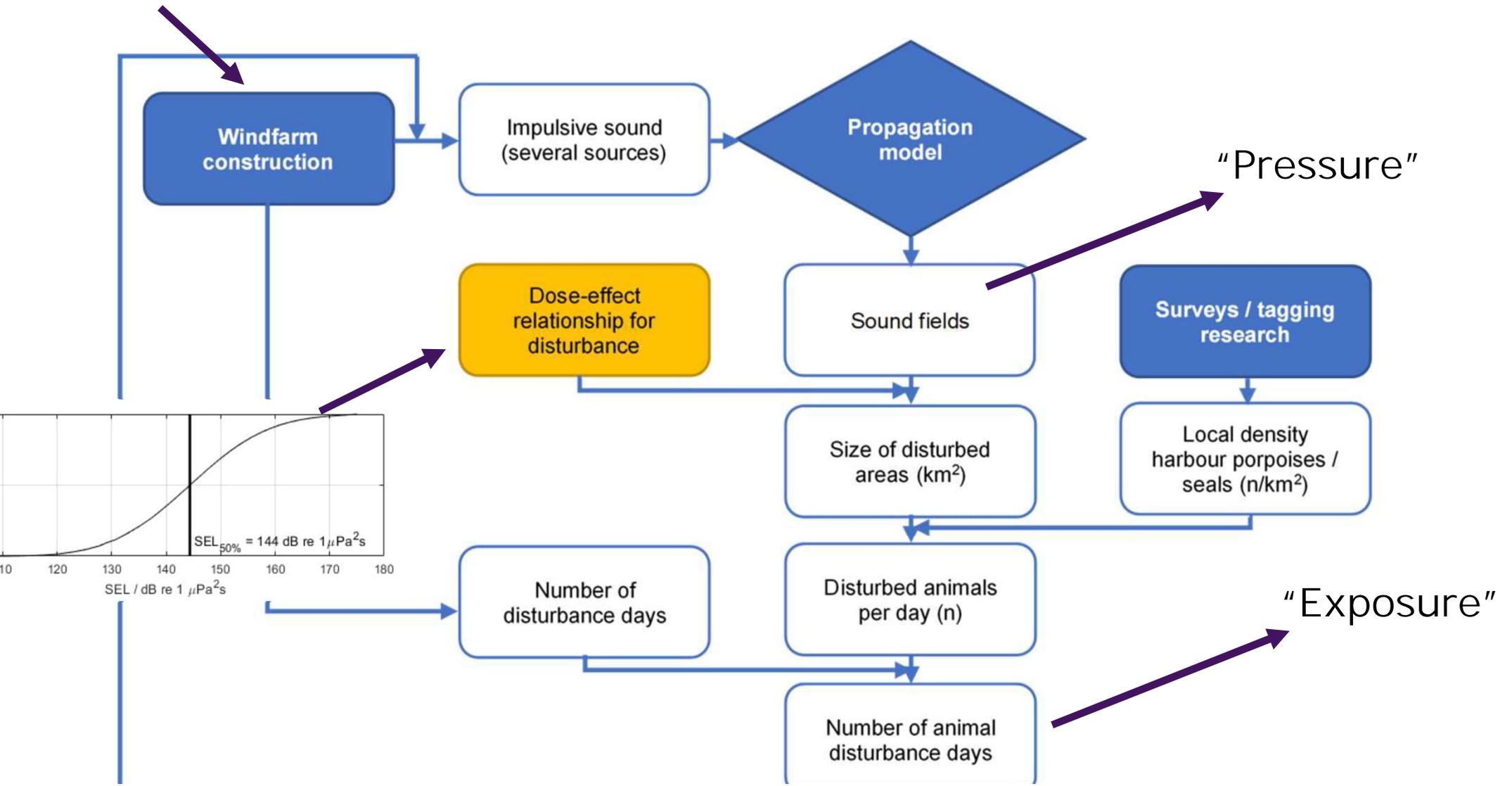
# Framework for Assessing Ecological and Cumulative Effects of offshore wind development on marine life

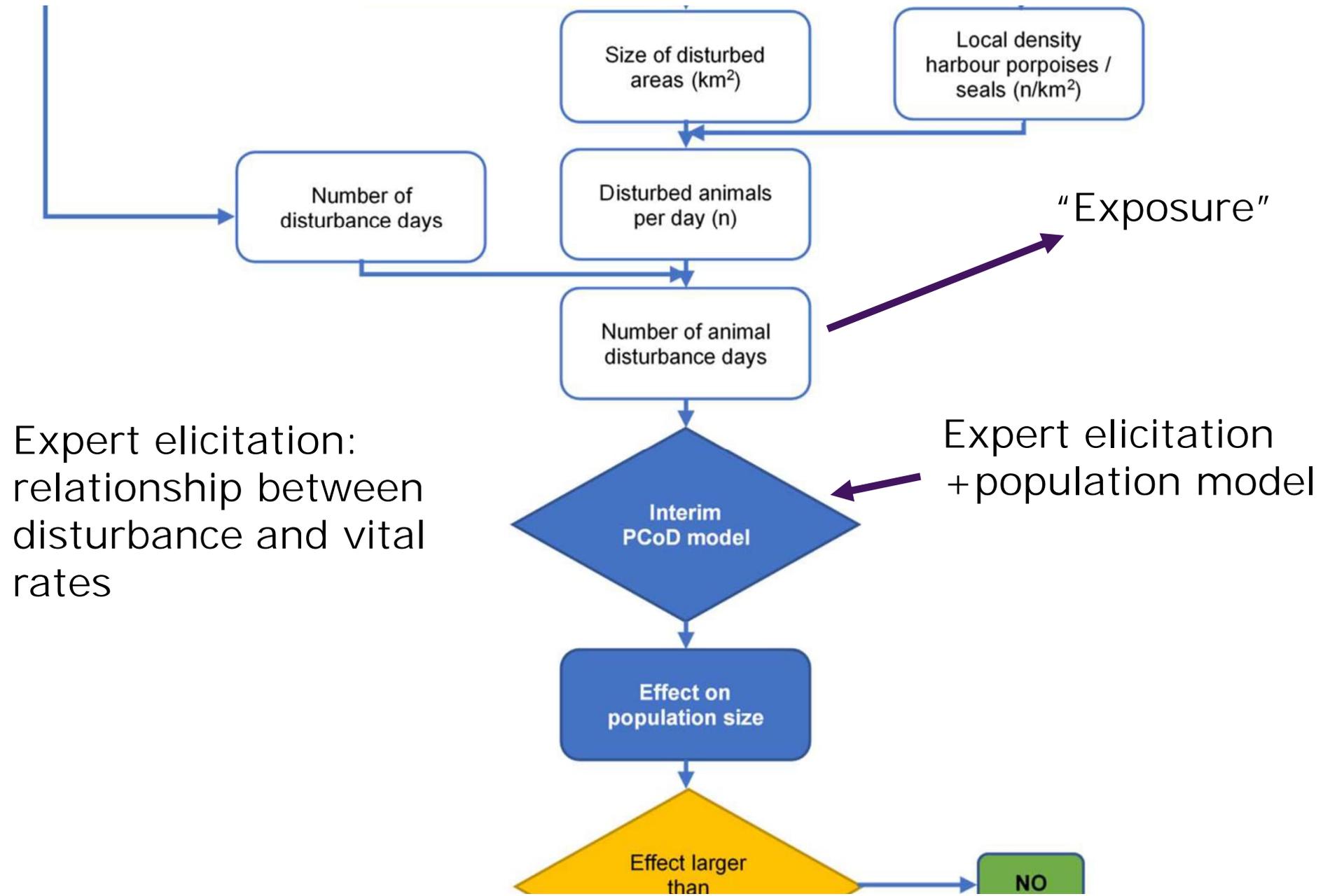
KEC4.0





# Scenarios





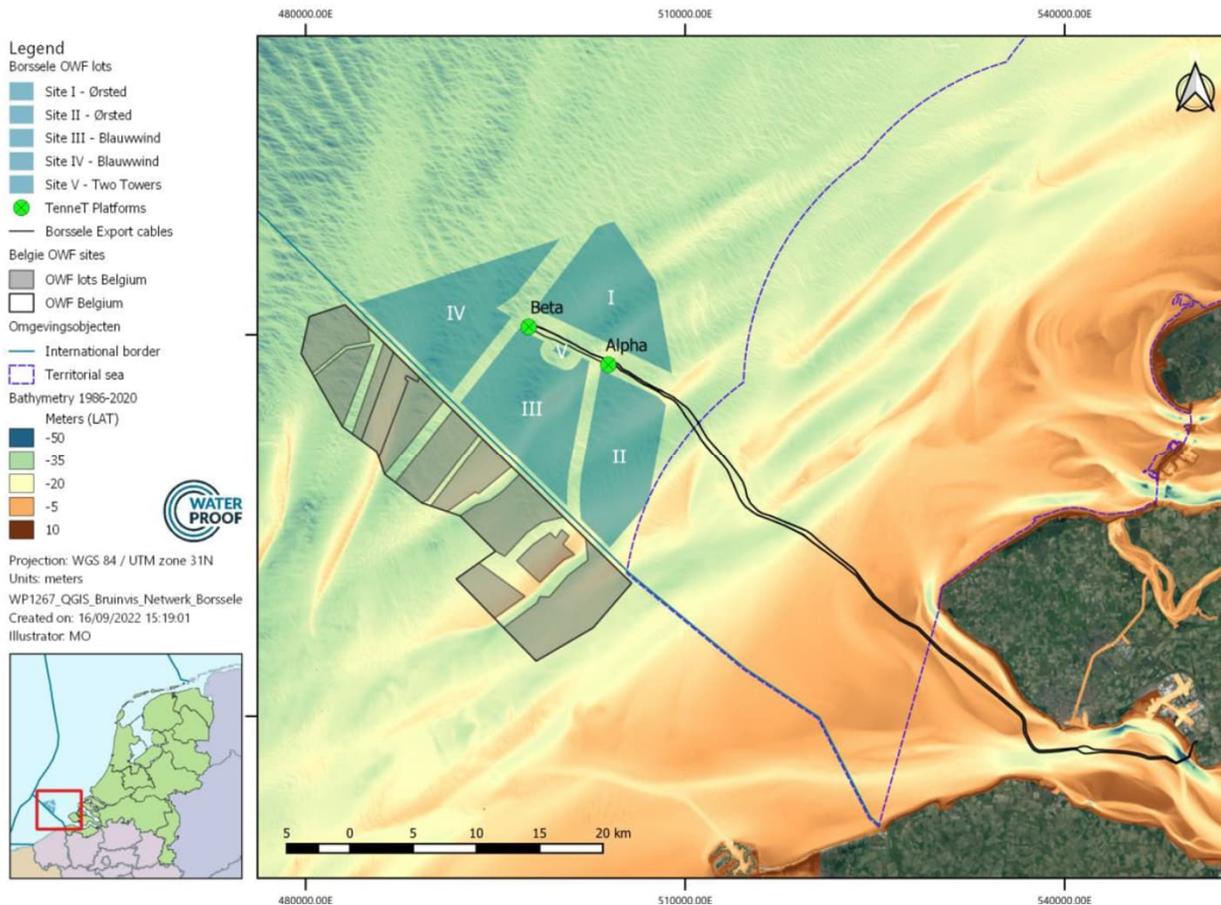


# Operational wind farms

- › Noise from wind turbines
- › Service vessels
- › Change of habitat
  - Food
  - Nature development
  - Other activities (e.g. solar energy)



# Bruinvisnetwerk Borssele, BNB (2021-2025)



### Legend

#### Borssele OWF lots

- Site I - Ørsted
- Site II - Ørsted
- Site III - Blauwwind
- Site IV - Blauwwind
- Site V - Two Towers

#### Bruinvis Network Borssele

#### Deployed Stations 2022

- CPOD
- CPOD/FPOD
- CPOD/FPOD/SoundTrap
- CPOD/FPOD/Sylence
- CPOD/SoundTrap
- HPTS/CPOD

#### Belgie OWF sites

- OWF lots Belgium
- OWF Belgium

#### Omgevingsobjecten

- International border
- Territorial sea

#### Bathymetry 1986-2020

#### Meters (LAT)

- 50
- 35
- 20
- 5
- 10



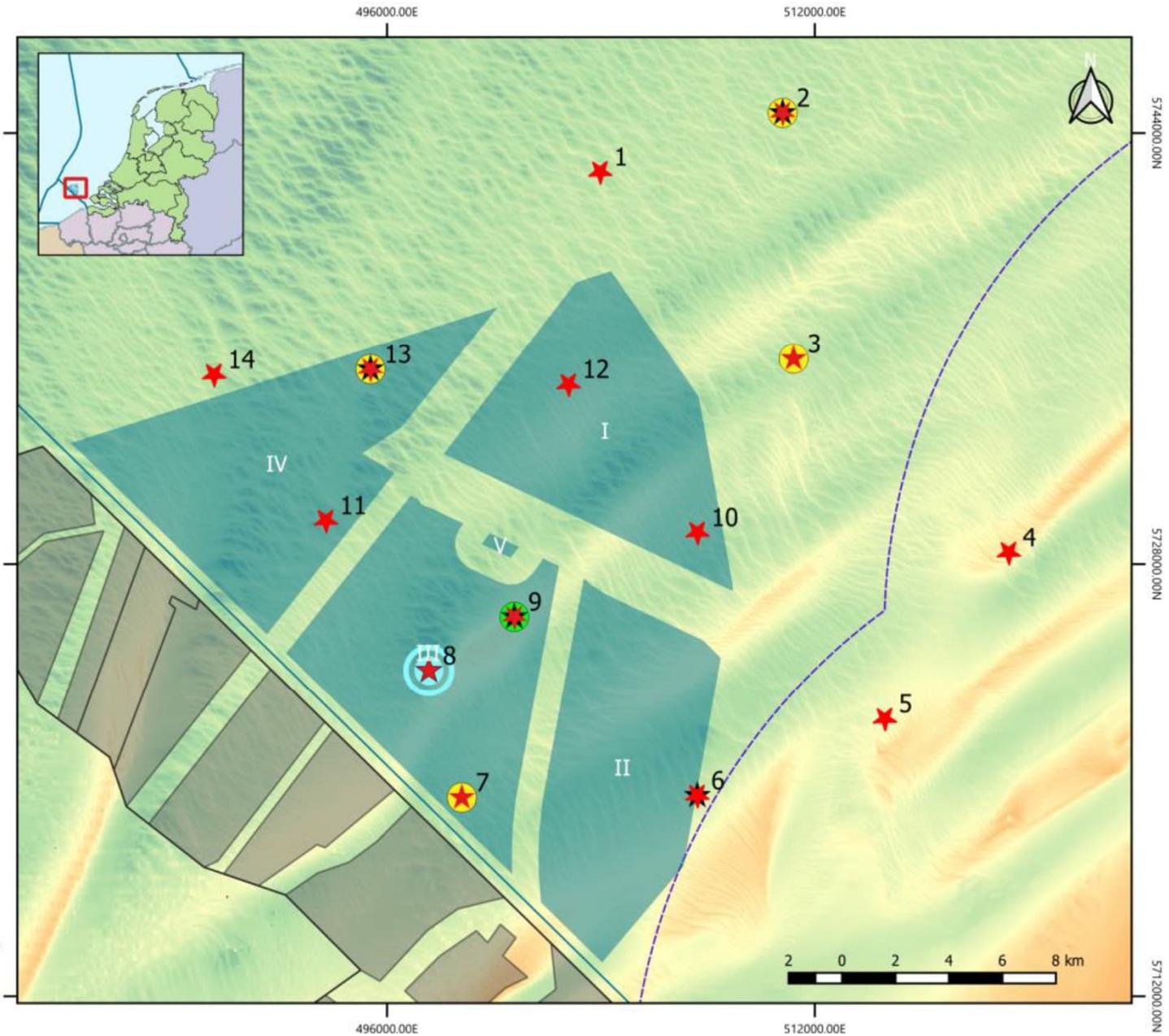
Projection: WGS 84 / UTM zone 31N

Units: meters

WP1267\_QGIS\_Bruinvis\_Netwerk\_Borssele

Created on: 29/09/2022 10:29:20

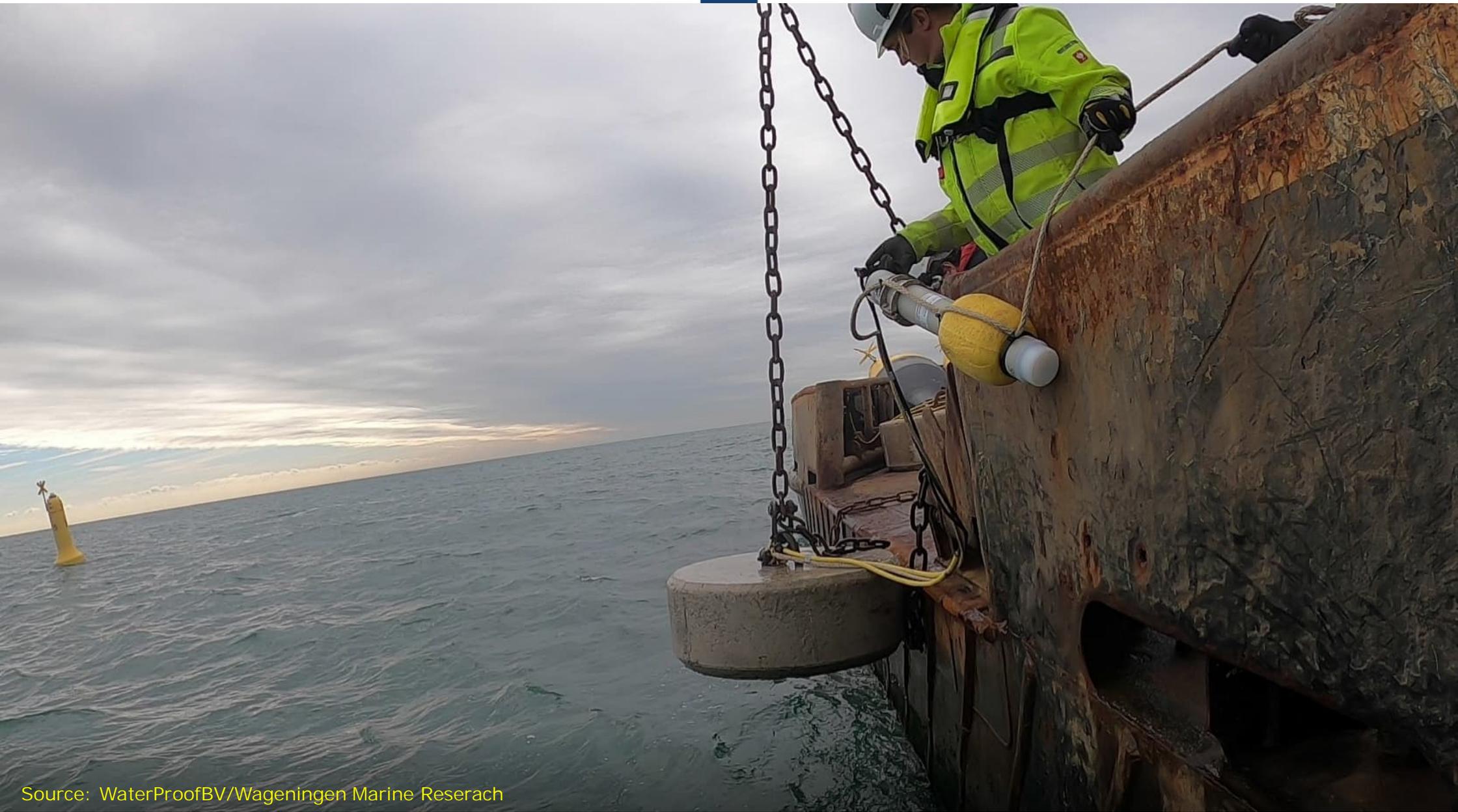
Illustrator: MO





## Research questions BNB

- › Presence and habitat use of Harbour Porpoise
  - Presence/abundance near Borssele versus reference area
  - Spatio-temporal variations
    - Observations
    - Link to activities
  - Analysis sounds by HP inside and outside area
  - Link observations to activity of porpoise (feeding buzz, communication)
  - Is Borssele site a suitable foraging area?
  - Translation to other areas for Offshore wind

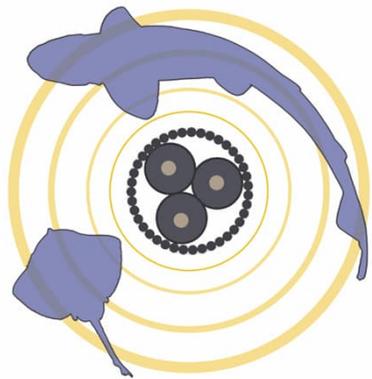


Source: WaterProofBV/Wageningen Marine Reserach



Source: WaterProofBV/Wageningen Marine Research

# Opstappers



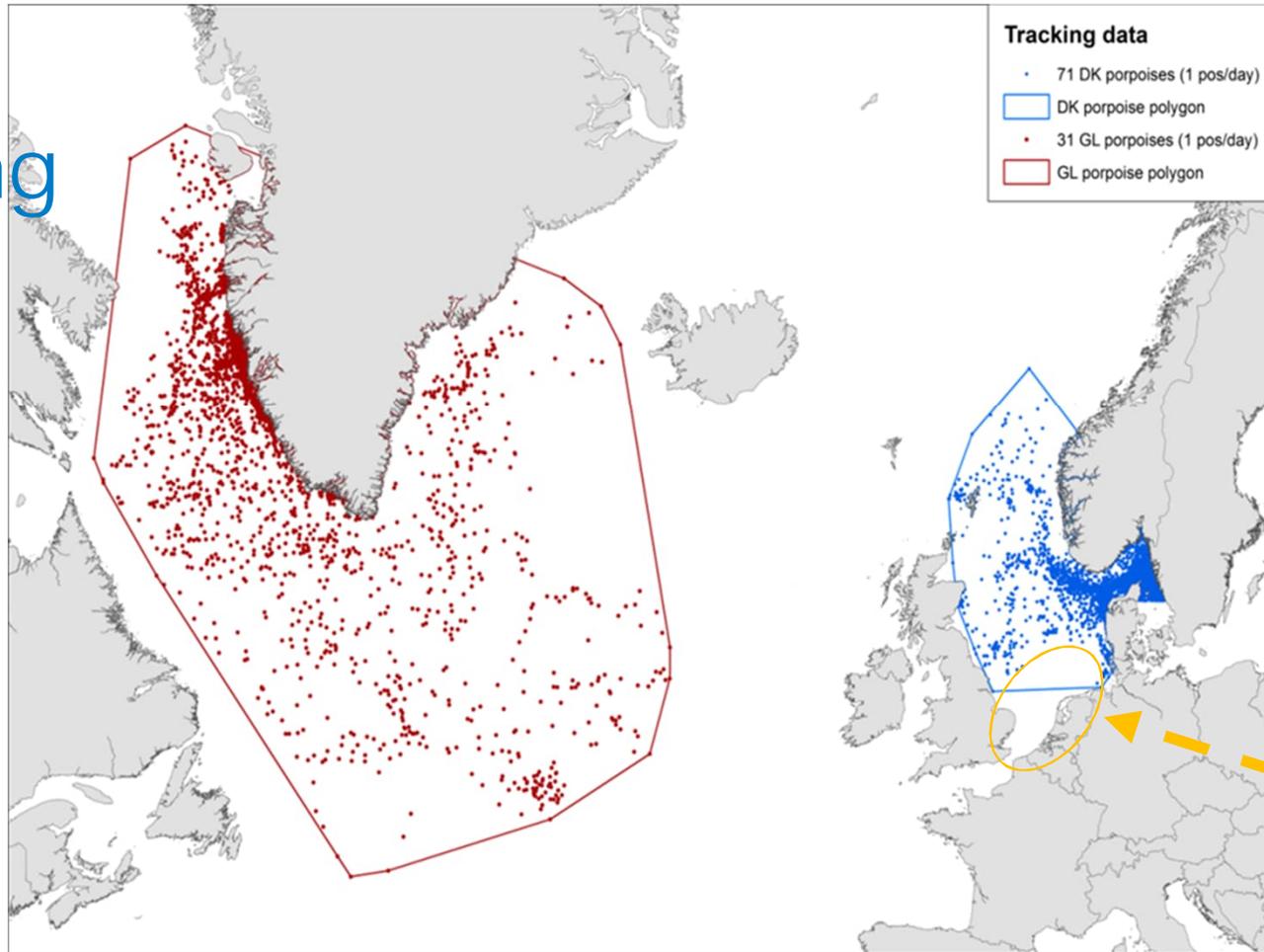
ElasmoPower



Source: ElasmoPower, Annemiek Hermans



# Tagging



Recorded satellite positions of 71 harbour porpoises tagged in Denmark (blue dots) and 31 in West Greenland (red dots). Black contour: southern North Sea. Adapted from Nielsen et al. (2018).



# Working plan

- › Research design such that every tagged porpoise gives information
- › Animal welfare is priority
- › Fased approach
  - Fase 1: Realistic plan for succesful tagging in the North Sea
  - Fase 2:
    - Preparation/training
    - Actual tagging of porpoises
  - Fase 3:
    - Data analysis focussed on southern North Sea
    - Reporting
  - Evaluatie fases 1, 2 & 3 (go/no go)
  - Fase 4: follow-up research based on results fases 1 and 2
  - Internal and external communication

Thank you for your attention

