



Rijkswaterstaat
Ministerie van Infrastructuur en Milieu



Offshore wind energy ecological programme WoZep

research programme
2016-2021

Ingeborg van Splunder
RWS, WVL



Wind farms at sea – ecological impact

Offshore wind energy ecological programme '16-'21

- Implementation of offshore wind farms (energy agenda)
- Importance of ecological effects
- Boundaries from nature legislation

Where are we now?



Former research

- Short list project 2010-2011
- VUM project 2013-2015
- OWEZ, PAWP, LUD, GEMINI

What have we learned so far?



Main pressures wind farm

- Under water noise
- collisions
- Habitat loss



Piling

Effects of underwater noise

- on fish larvae
 - > effects smaller than expected
- on seals area of disturbance less than 80 km
- on harbour porpoise more than 12 km





Collisions

birds

- Sea birds
- migrating birds (crossing the NCP)
- Coastal breeding birds (fouraging on sea)

Bats

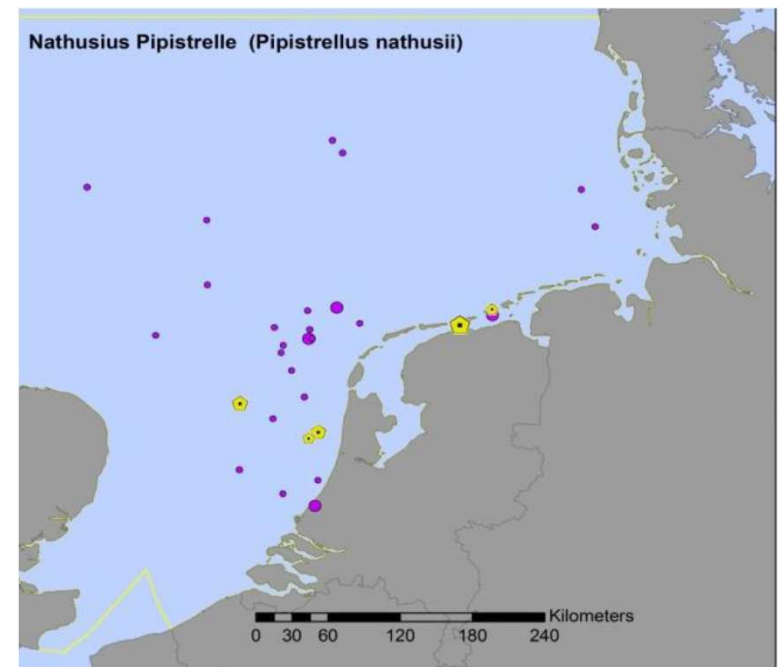




Possible effects on Bats

- 'Massive' gap in knowledge
- Max 3 species, min 1 species (*Nathusius' pipistrelle*)
 - Only spring and fall
 - At night
 - Wind speed < 6,5 m/s

Land based knowledge:
Substantial amounts of
Bats are killed by wind farms





Habitat Loss/displacement

Birds

- Assumption: 10% mortality of 'displaced' seabirds





Mitigation

Harbour porpoise + seals

- Technical noise reduction
- Consider legal threshold noise

Birds:

- Larger (> 4 MW) turbines,
- Start/Stop procedure during massive migration

Bats:

- Higher cut in wind speed during low wind periods in migrating periods





Why Wozep



Goals of Wozep research programme

- Reduce uncertainties knowledge gaps and assumptions EIA, AA and KEC
- Effectiveness mitigation measures
- Reduce uncertainties upscaling Wind farms after 2023





Wozep activities so far



- In 2016 pilots and feasibility studies – first results
- Formulating goals and research questions
- Involvement of stakeholders and contractors
- Programme 2017-2021
- Preparation of tenders
- Anticipate on use of research results





Wozep research marine mammals

Marine mammals

1. Underwater noise - acoustics
2. Effect of noise on seals and harbour porpoise
3. Effect of noise on populations of marine mammals
4. Spatial distribution seals





Wozep research birds and bats



Birds and bats

1. Validation of collision model and population effects
2. Validation of assumptions habitat loss birds (modelling and field work, scenario's)
3. Insight in bat population (size, migration)



Wozep research benthos and fish

- Habitat change in the wind farms?
- Absence of fisheries, long term development
- Effect of electro-magnetic fields on fish



Furthermore

- Seeking international cooperation
- Data exchange
- Data management, open for re-use
transparency, reproducible

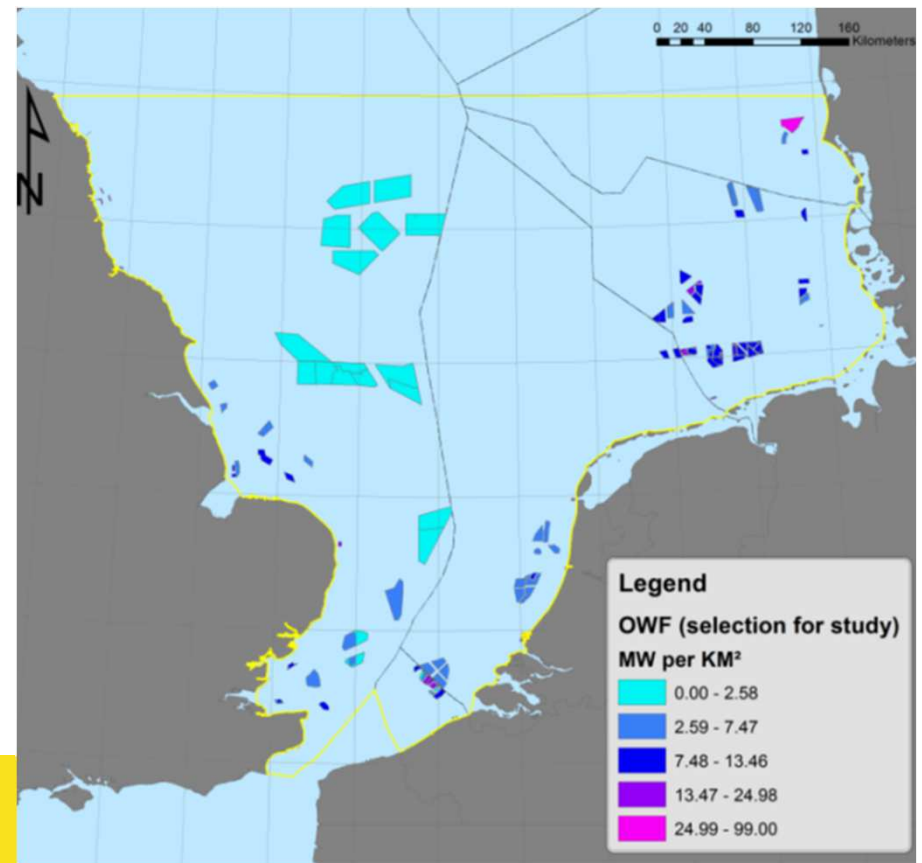
Wozep knowledge will be used to improve KEC



Cumulative effects (KEC)

On national and international scale

Southern North sea as biogeographic region





Questions?