The NSW-MEP Environment

NZW-16-M-9-R02

The Offshore Wind farm Egmond aan Zee is the first offshore wind farm project in the Netherlands. In an international context this project is in the forefront of the development of offshore wind energy. The current feasibility of wind farms offshore is enabled by subsidies. To reach a situation where wind energy can compete without additional funding cost reduction is required.

The planning of the OWEZ project was done carefully. Nevertheless it was inevitable to use to a certain extent “on shore” knowledge of effects of wind turbines on the environment. Fundamental knowledge has to be obtained to enable even more environmental friendly designs of offshore wind farms in the future.

Both goals are supported by the NSW-MEP program, part of the OWEZ project. Under this program research will be carried out. The technology research will support cost reduction and efficiency improvement, where the ecology research addresses the local environmental impact above and under the sea surrounding the wind farm.

This presentation provides an overview of the ecology part of the research. A similar presentation is available on the technology part of the research.

Research institutes working on the Monitoring en Evaluation Program

Environment

- Birds
- Sea mammals, fish and benthos
- Landscape (societal aspects)
- Shipping and Safety

Technology

- Energy production
- Wind resource
- Technical and economical aspects

Main goal NSW-MEP environment:

To support development of wind energy off shore by:

- Development of knowledge on environmental impact of the OWEZ project
- Results available for third parties
- Reports published at www.noordzeewind.nl

Research topics of the NSW-MEP:

- Birds
- Sea mammals
- Fish
- Benthos
- Public opinion
- Shipping

Questions w.r.t. birds:

- How many collisions will take place and what species are involved?
- Will bird flight patterns be influenced and if yes how?
- What will effects be on populations?

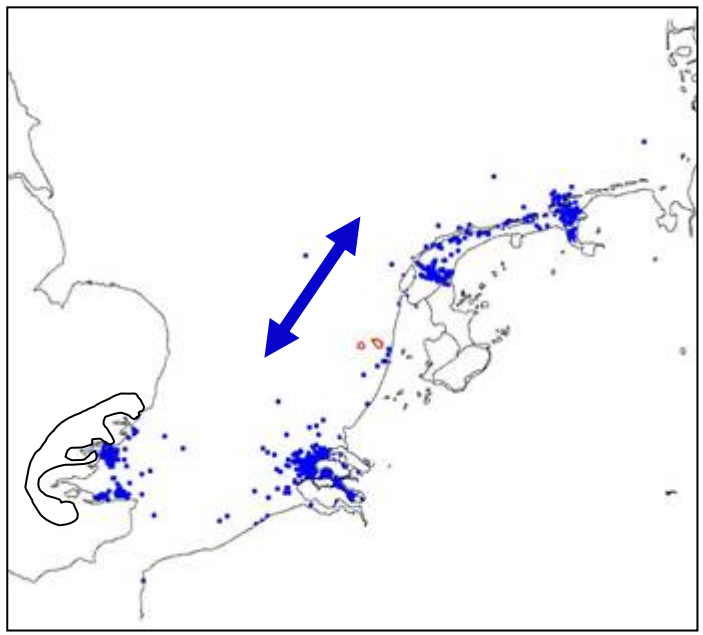
Bird investigation methodology:

- Collision measurement by sensors in the wind turbines, video imaging and computer registration (WT Bird or similar system)
- Bird flight patterns and local movements by:
  - Radar surveys on a wind turbine of the wind farm
  - Radar surveys outside the wind farm
  - Human eye and boat surveys in the wind farm
- Development of prediction models to calculate effects on population
- Field work in 2007 and 2008

Expected results bird investigation program:

- Order of magnitude for disruption of flight pattern, collision and barrier effect
- Comparison with on shore and extrapolation to further off shore possible
- Effect evaluation enabled and design parameters developed

Hypothesis and question w.r.t Seals :



- More migration between Voordelta and Waddensea expected
- What influence will the OWEZ have?

Seals investigation methodology:

- Marking seals with transmitters
- Registration of time and place of received signals
- Methodology already used in other programs, NSW-MEP is creating extra statistics
- Field work in 2007

Expected results seals:

- Extra information about the use of the habitat
- Knowledge if the wind farm attracts or disturbs seals

Question w.r.t. harbour porpoises:

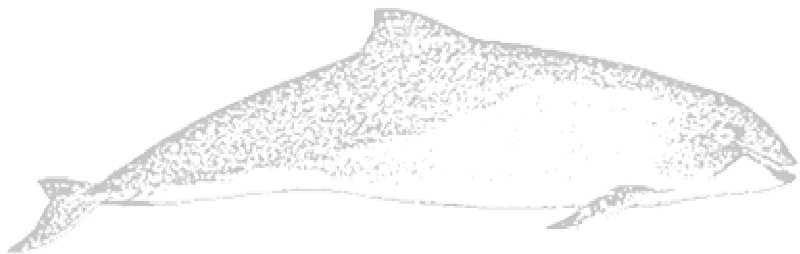
- Will the wind turbines attract or disturb these animals?

Harbour porpoises investigation methodology:

- TPOD´s in and around wind farm showing presence
- Human eye during bird surveys
- Field work in 2007 and 2008

Expected results harbour porpoises:

- Information about the use of the wind farm area
- Reference data influence of wind farms



Questions w.r.t. fish:

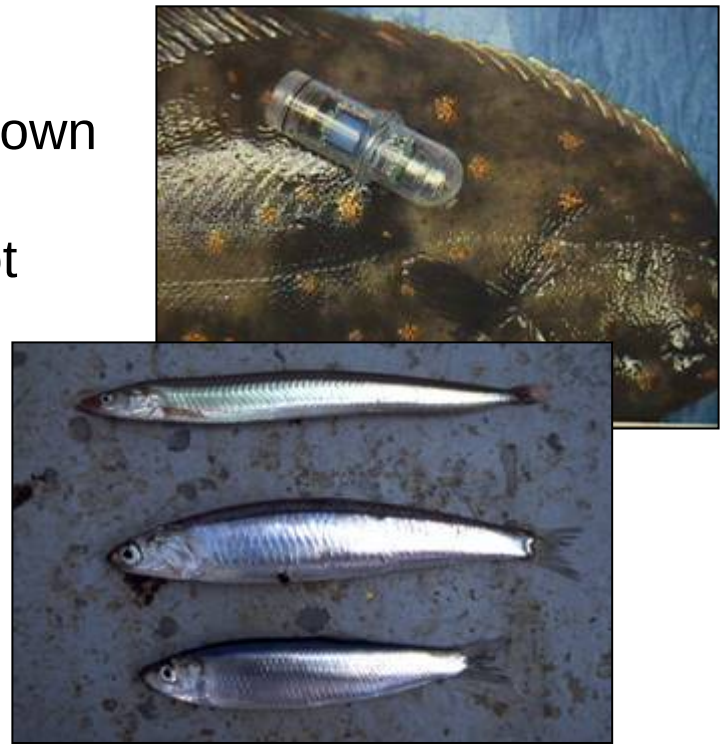
- What effects will the OWEZ have on fish?
- What risks will occur due to the OWEZ?
- What chances will pop up?

Fish investigation methodology:

- Surveys to determine changes in the fish community
- Determination of the time fish (group and individuals) is present in the wind farm area
- Emphasis on process knowledge instead of monitoring only
- Field work in 2007, 2008 and 2011

Expected results fish:

- Effects of the wind farm will be known
- Refuge function established or not
- Relevant processes known



Question and hypothesis w.r.t. benthos:

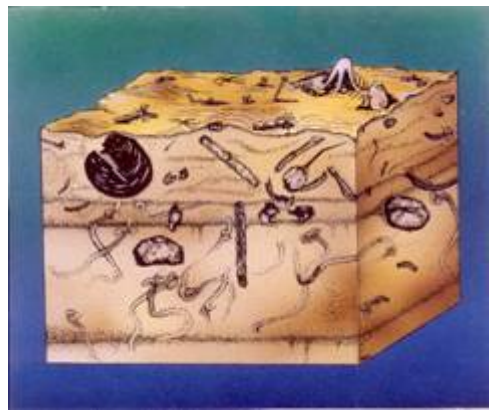
- What effects on benthos at the site will the OWEZ and the accompanied end of fishing have?
- Number of fish species will increase due to fishing stop
- Fishing stop will lead to upward shift in age of fish
- Food production for fish and birds will change (+?, -?)

Benthos investigation methodology:

- Sampling the soil at the OWEZ site and in reference area´s
- Using various sampling techniques to find all species present
- Understanding of processes and relation with fish
- Field work in 2007, 2008 and 2011

Expected results benthos:

- Better understanding of underlying processes
- Effects of fishing stop on:
  - bottom fauna
  - refuge function
  - food production
  - Population set up in terms of age and species



Questions public opinion:

- How is OWEZ perceived by the different groups involved?
- What is the attitude toward offshore wind energy?
- What effect will OWEZ have on visitors to the beach at Egmond aan Zee?

Public opinion investigation methodology:

- 4 “waves”: zero phase, year of construction, year 1 and 2 (2008)
- Inhabitants, visitors (NL and GE), internet panel of respondents, local business owners

Expected results public opinion:

- Clear view on people´s opinion towards the OWEZ
- Impression on influence of the wind farm on attractiveness of Egmond aan Zee

Questions safety and ships:

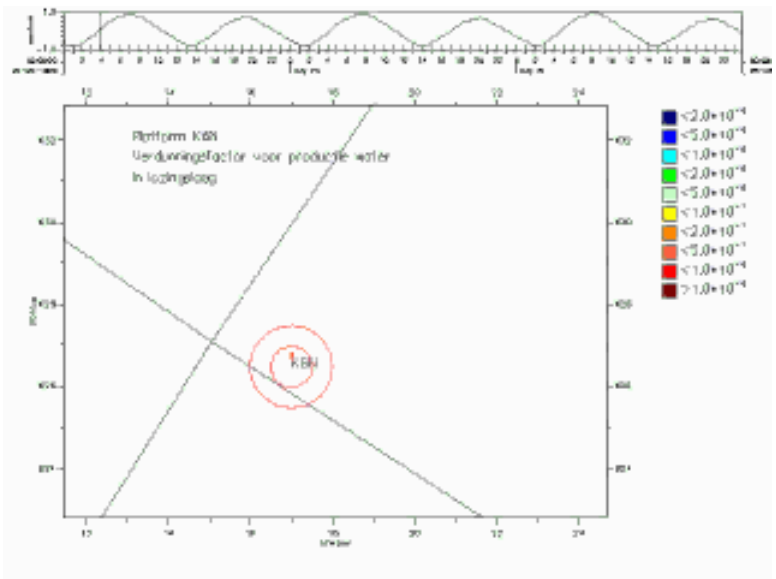
- What are the risks for ships due to the OWEZ?
- What will the consequential damage be of a ship collision?
- What influence will occur on radar?

Investigation methodology:

- Using existing computer models to calculate collision risk
- Reporting incidents and accidents
- Modelling effects of oil spills
- Shipping radar using existing simulator

Expected results safety and ships:

- Insight in collision risks and consequences of oil spills
- Insight in effects on shipping radar



Indicative planning:

- Intermediate reports birds, sea mammals, fish and benthos Q2 - 2008
- Final report public opinion Q4 2008
- Final reports birds, sea mammals Q2 2009
- Final reports fish, benthos Q2 2012
- Safety and ships: finished, report available

Data confidentiality:

- Not applicable, all data and reports derived out of the environmental research will be public
  - Available on the internet: www.noordzeewind.nl and www.windoffshore.nl