



Rijkswaterstaat
Ministerie van Infrastructuur en Milieu



Tussenstandbijeenkomst Wozep 2018

BENTHOS

9 april 2018



Introduction: Soft substrate benthos

- Benthos important as food source for the foodweb;
- Effects on benthos due to the exclusion of fisheries?
- No significant effects at T6, what about T10?

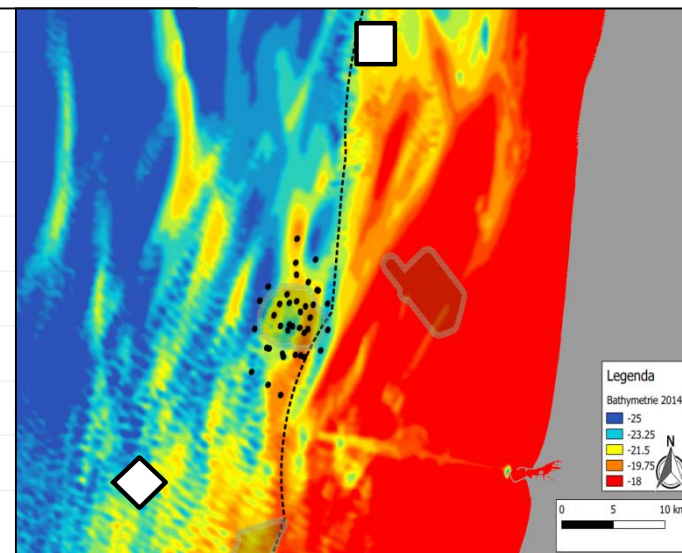
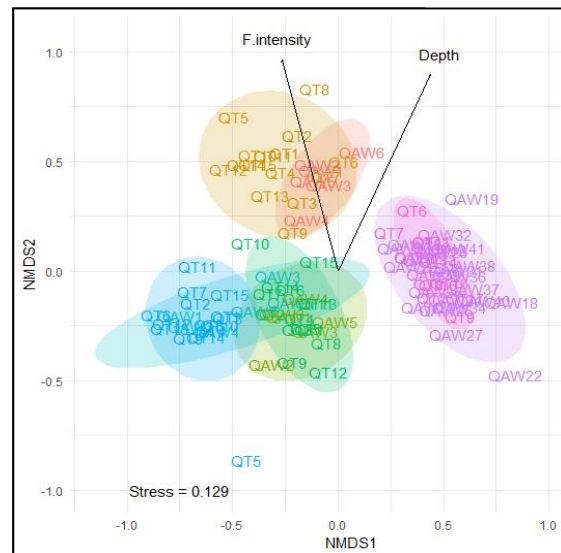
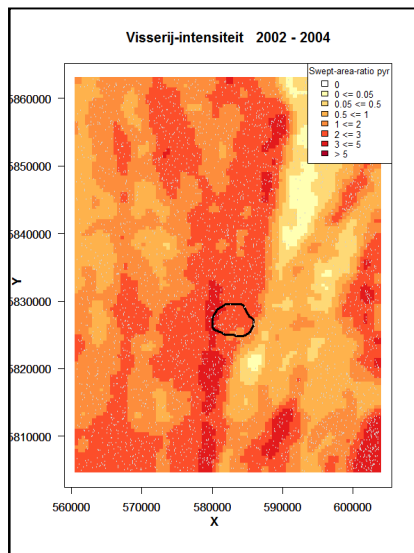
In future:

- More windfarms;
- Free passage and shared use (doorvaart en medegebruik);
- Nature restoration, natural and slow or active (flat oyster restoration projects, or “Nature inclusive” windfarms)
- Allowing of passive fishing, beam (or pulse) trawling?



Soft substrate benthos

- MEP: no significant effects (T6)
- WOZEP (2017): Are there effects on benthos (T10)?
(Inter)national literature study, power analysis, fishing intensity, different reference locations but
- No significant differences...





Hard substrate benthos

- MEP: Monitoring in 2008 and 2011 4-5 monopiles (PAWP and OWEZ)
- 55 species -> 78 species

WOZEP:

What is situation in 2018 (T10), baseline for “Nature inclusive” windfarms?

Approach:

- (Inter)national literature study on the effects of windfarms on benthos, recommendations for future research.
- Similar monitoring as in 2008 and 2011 4-5 monopiles (PAWP and OWEZ), same executive parties, taking DNA samples (eDNA), compiling genetic database and exploring new techniques.

But:

- Very expensive...



Fish

- MEP (2008-2011, IMARES / WMR):
- Hardly any changes in fish composition, only near scour protection

WOZEP: $T > 5$, 2018-2020?

VUM (Vervolg Uitvoering Masterplan):

- No damage on fish larvae and seabass during piling;

But:

- What about uw noise - behavior of benthos (bivalves) and fish;
- Differences in hearing characteristics compared to sea mammals.



EMF

- International literature study (Waterproof):
- Many anecdotal examples of EMF influence;
- More cables and higher capacity;
- No influence on eel and salmon (Orpwood et al. 2015, Armstrong et al. 2015).

WOZEP Monitoring (2018)?

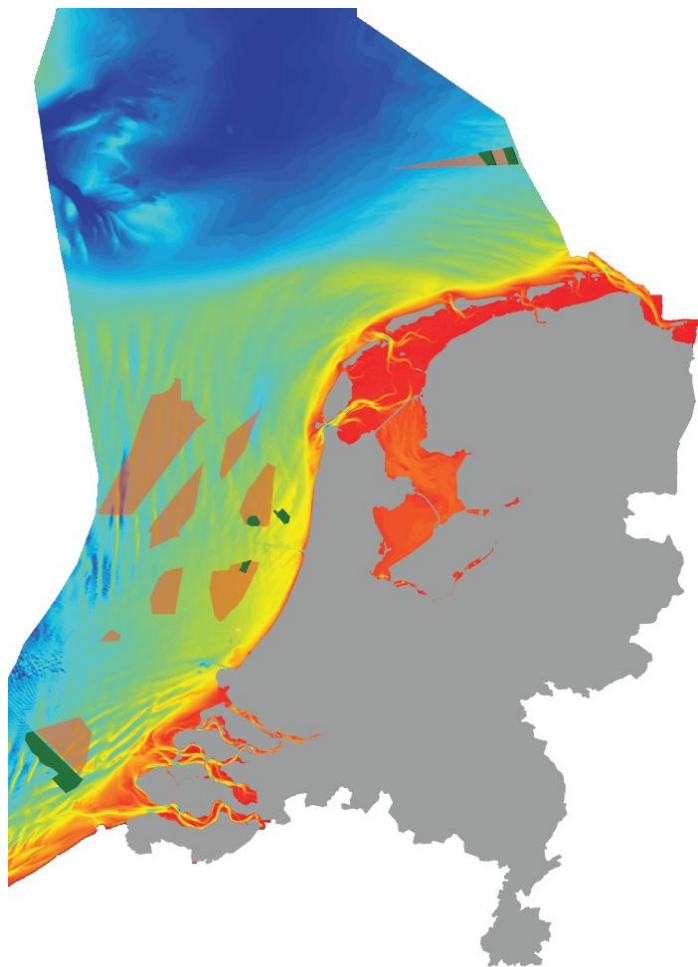
- Field validation of modelled EMF (Waterproof)?;
- Lab experiments with EMF with a focus on protected species (benthos, fish, sea mammals?)?

But:

Other countries have more experience.. looking for collaboration e.g. Marine Scotland and/or...



Discussion: what's next?



- Continuing monitoring ($T > 10$)?
- More windfarms
- Free passage and shared use;
- Allowing of passive fishing and even beam (pulse) trawling;
- Nature restoration, natural/slow or active (flat oyster restoration projects);
- “Nature inclusive” windfarms (flat oyster on scour protection or cod)?

- *Ecosystem effects, >hard substrate, > filtration rate, > turbulence and mixing, > primary production, > turbidity, > food birds and mammals and also collisions.*