

Biodiversity of offshore platforms

Introduction to PhD project

Biodiversity and multifunctional use of old production platforms and new offshore wind farms

Joop Coolen, 28 November



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- Status report
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Introduction: personal

Education: Marine biology



Ecologist & project manager 2008 – 2012
→ involved in LINSI reports



Current position: PhD-student IMARES



Commercial & scientific diver
SCUBA & SSE



Secretary of the board



Introduction to project

- Promotor: Han Lindeboom (IMARES/WUR)
- Co-promotor: Steven Degraer (RBINS-MUMM/UGent)
- Partners:



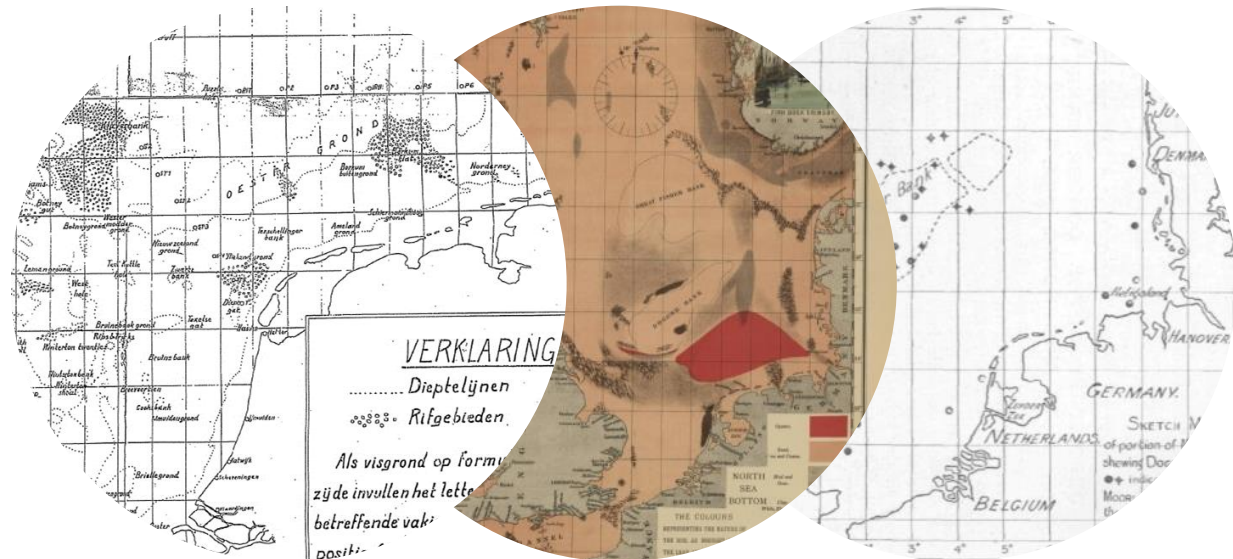
Management Unit of the North Sea Mathematical Models
MUMM | BMM | UGMM
Department VI of the Royal Belgian Institute of Natural Sciences



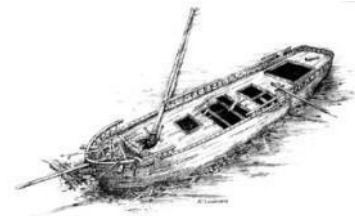
Others?

Introduction to project

- Historic maps & reports show large offshore reefs^{1,2}
- Most of these reefs have disappeared (Oyster Grounds)
- New hard substrates were introduced



Offshore artificial hard substrates North Sea



Amount	Total: 547 NL: 135 ²	Total: ~45.000 NL: ~2.600 ²	Total: ~1.300 NL: 124 ¹
Age	0 – <46 years	0 - >100 years	<10 years
Future	↓	—	↑

Research objectives

- Create historic & current overview of hard substrates;
- Assess biodiversity of natural & artificial hard substrates;
- Evaluate stepping stone & refugium effect, influence on:
 - Spread of the Blue Mussel;
 - Indigenous and non-indigenous species;
- How to maintain biodiversity after decommissioning;
- Evaluate how MUPs can protect/restore biodiversity.

Current knowledge NL platforms

- 1 study after gas leak in 1983 with limited results¹
- 3 studies on wrecks²⁻⁴
- 2 studies on wind farms^{5,6}

Hardly any knowledge on biodiversity offshore platforms NL
→ PhD project

1 Buuren, J. van. Ecological survey of a North Sea gas leak. *Mar. Pollut. Bull.* **15**, 305–307 (1984).

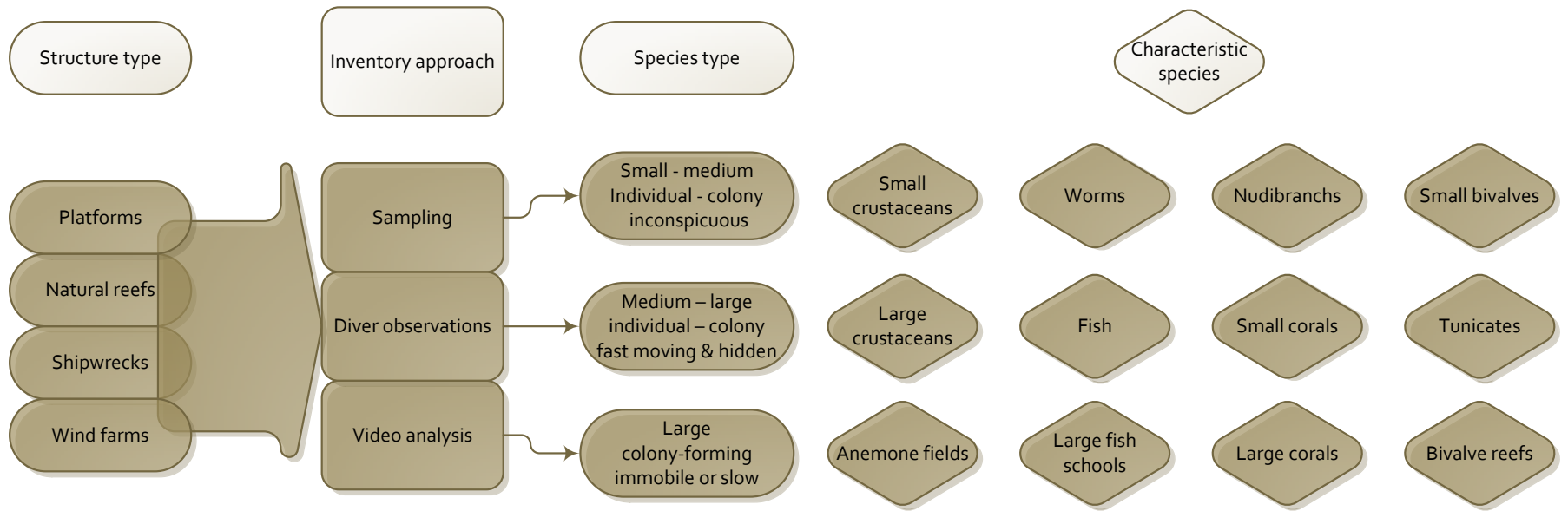
2 Leewis, R. J. & Waardenburg, H. W. Environmental impact of shipwrecks in the North Sea. *Water Sci. Technol.* **24**, 297–298 (1991).

3 Lengkeek, W., Coolen, J. W. P., *et al.* Ecological relevance of shipwrecks in the North Sea. *Ned. Faun. Meded.* **40**, 49–58 (2013).

4&5 unpublished data

6. Bouma, S. & Lengkeek, W. Benthic communities on hard substrates of the offshore wind farm Egmond aan Zee (OWEZ), report.

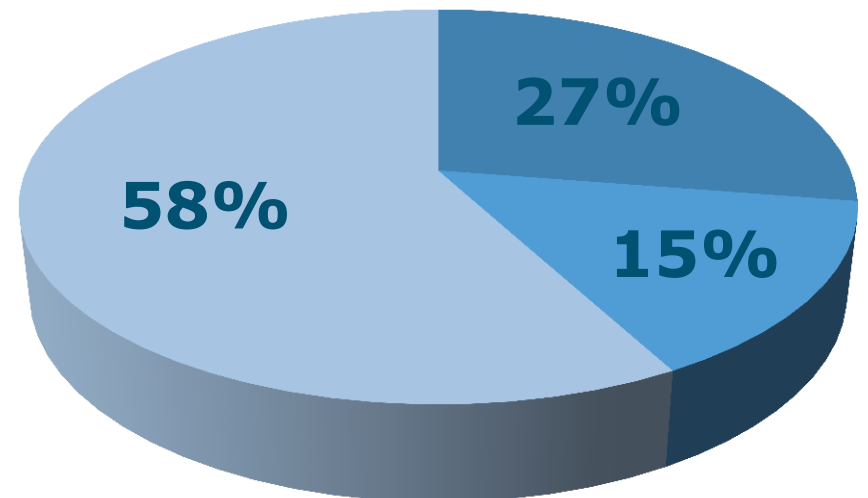
Research approach



Video images vs. diving

- ROV very useful for:
 - Observing large and slow species
 - Covering large area
- 85% of species missed on ROV images

■ Visual ■ Video ■ Sample



Results 2013

- 2013: start & test sampling hard substrates
 - (Ship)wrecks NL with wreck divers
 - Borkum reef grounds IMARES project

- Results
 - 35 locations visited
 - Wreck platform Interocean II †1989
 - 66 samples
 - Analysis: work in progress

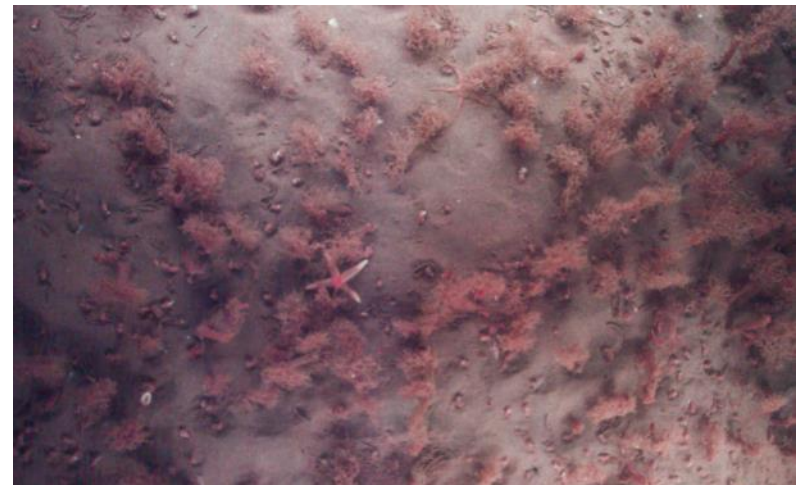
Example: Borkum Reef grounds

- Natural reef north of Schiermonnikoog?
 - Investigated for Natura 2000 habitat reefs
- Are reefs present? Which species?

Many expected rocks were actually sand mason reefs:

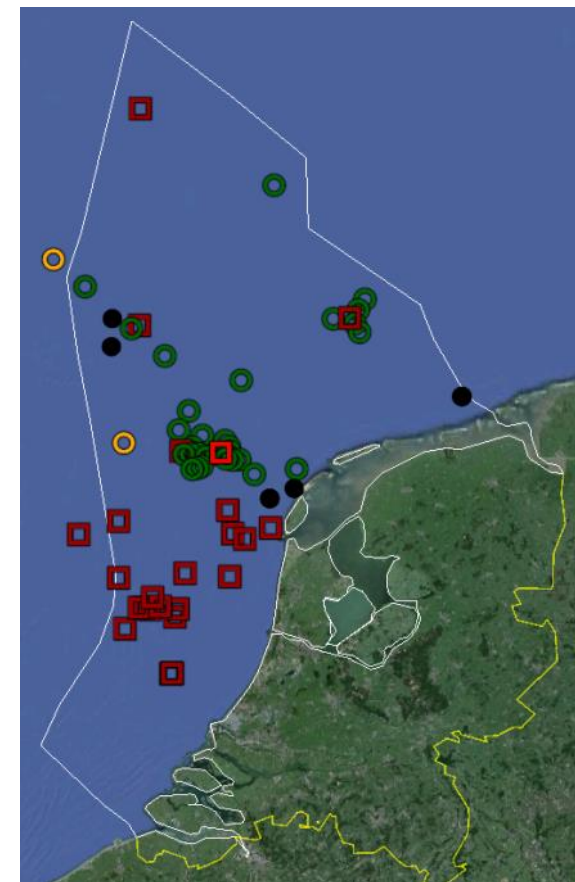


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Work plan 2014-2016

- 10 offshore platforms (200 samples)
 - GDF SUEZ locations
- 5 wrecks (100 samples)
 - Including Interocean II & Ocean prince
- 3 natural reefs (60 samples)
 - Texel stones, Cleaver Bank, Borkum reef
- Wind farm NL & BE → available data
- Other wrecks → available data



- Possible locations to assess:
- platform GDF SUEZ
 - platform wreck
 - ship wreck
 - natural reef

Sampling platforms

- GDF SUEZ offered to facilitate access to platforms
- Diving with Bluestream Offshore (Den Helder)
- SSE diving air in maintenance dive team



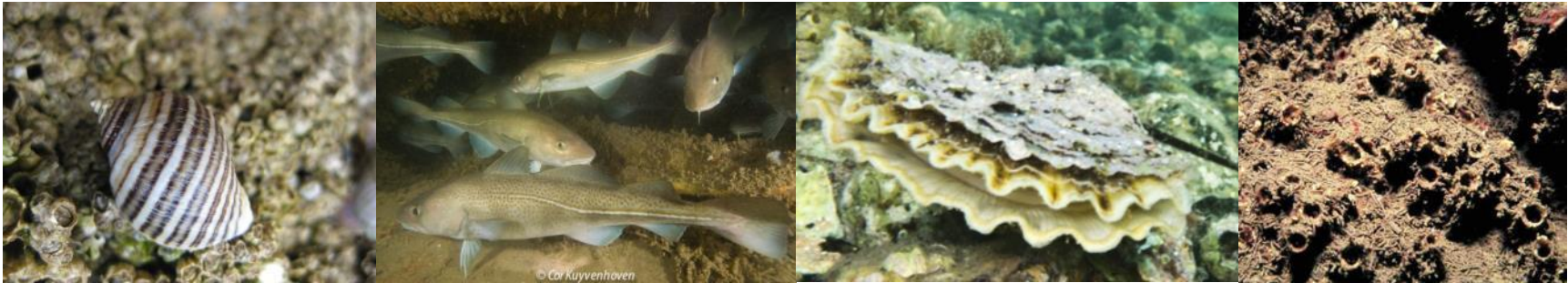
Expected results

- Between 250 – 300 species present on all structures;
- Indigenous species use oil & gas platforms as refugium;
- Oil & gas platforms are used as stepping stone to (re)colonise the North Sea;
- The communities on deeper part of oil & gas platforms are identical to those on natural reefs;
- Several *important* species will be present.



Species expected at O&G platform sites

- Threatened & declining species defined by OSPAR



Dog Whelk? - Atlantic Cod - Edible Oyster - Sabellaria worm

- Reef indicator species relevant to Natura 2000



Dead man's finger – sponges – Whelk – Encrusting worms

Thank you for
your attention



Information Joop Coolen

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■ Certificates

- Surface supplied diver SSE wetbell & Cat. B
- NOGEP A 0.5A
- Safety at work & VCA-VOL & basic first aid
- Boating license (Vaarbewijs I & II)

References

- Photos: www.udovandongen.com, www.corkuyvenhoven.com, www.gimaris.com.
- Olsen, O. T. The piscatorial atlas of the North Sea, English and St. George's Channels, illustrating the fishing ports, boats, gear, species of fish (how, where, and when caught), and other information concerning fish and fisheries. (1883).
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