PROSPECTIVE SAND EXTRACTION ON THE HINDERBANKEN: MONITORING STRATEGY FOR FUTURE IMPACT ASSESSMENT

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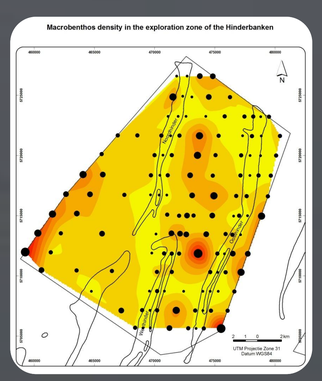
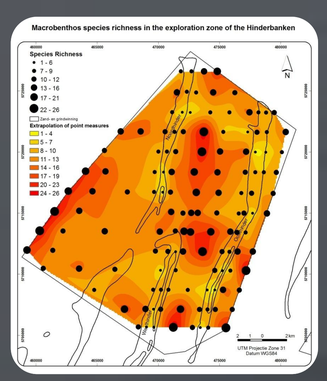
INTRODUCTION

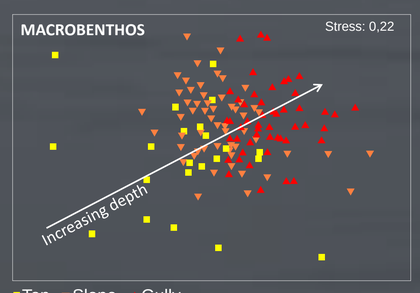
The exploitation of sand in the Belgian Part of the North Sea (BPNS) started in 1976, and the extracted volume rapidly increased from 29.000 m³ to a current extraction of > 1.800.000 m³. **In 2004**, 3 zones were (re)defined as sand extraction zones, while part of the **Hinderbanken** sandbank complex was assigned as **exploration zone IV**, mainly based on the assumption that gravel and coarse sand (essential for beach replenishment) are abundantly present. A **baseline study** of the area was essential to describe the biological characteristics and to demarcate areas of high ecological value. Based on this biological survey and a seismic survey (Renard Center of Marine Geology, UGent), **two zones** with the largest potential for sand extraction are **recommended**. Based on a Before-After Control-Impact **(BACI) design** the benthos of these two zones will be monitored.

BIOLOGICAL BASELINE STUDIES

MACROBENTHOS:

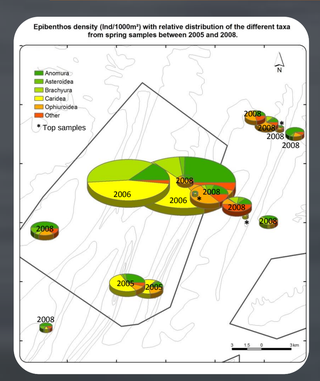


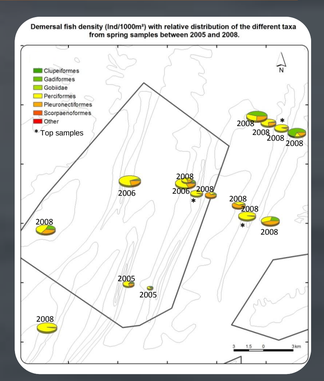




- 129 Van Veen samples over 4 years (2004-2008) within exploration zone IV
- 116 different taxa, many species restricted to only a few samples
- **dominant species**: *Nephtys cirrosa*, and the interstitial species *Hesionura elongata* and *Polygordius appendiculatus*
- **typical species**: Syllidae sp., *Glycera lapidum* and *Branchiostoma lanceolatum*, predominantly restricted to gullies
- species community is predominantly influenced by **depth**; highest density and species richness in the gullies.

EPIBENTHOS AND DEMERSAL FISH:





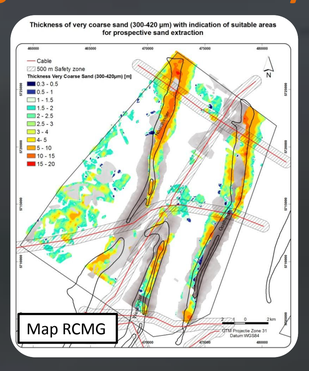
- 8 beam trawl samples within exploration zone and 8 reference samples between 2005 and 2008; 3 on sandbank tops
- 31 epibenthic species, dominance of hermit crab, flying crab, brown shrimp and brittle stars
- 25 demersal fish species, dominance of lesser weever, dab, whiting and reticulated dragonet
- High **interannual variation** => exceptionally high dominance of caridean shrimp in 2005/2006
- Epibenthos densities on banks significantly lower (c.f. macrobenthos); high dominance of lesser weever (*Echiichthys vipera)* on tops => indication of **gully-bank gradient.**

SET-UP OF BEFORE-AFTER CONTROL-IMPACT (BACI) DESIGN

Recommendations based on biological baseline:

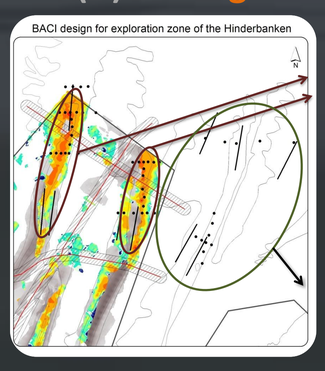
- **Avoid** extraction in the **gullies**
- **Simultaneous sampling** necessary, especially for epibenthos and demersal fish
- Allocate a **reference zone within zone IV**, where extraction is prohibited, to allow for a sound impact assessment

Geological seismic survey (RCMG)



- 320-400µm sand = suitable for beach replenishment
- Best exploit thickest (=orange) layers

B(A)CI design



- C + I simultaneously sampled in autumn 2009
- Recommendation to allocate part of potential impact area as ‘ideal’ control area.

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