# Measuring the impact degree of different pressure types with the Benthic Ecosystem Quality Index (BEQI) H:25



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Water Framework Directive
Marine Strategy Directive
Habitat and Bird Directives

Healthy ecosystems where anthropogenic influences are well-managed

- Impact assessment
- Physical disturbance (fisheries, sand extraction, dredging)
- Pollution (chemicals, nutrients)
- Construction works (harbours wind farms, coastal defense)
- Recovery assessment

#### • Benthic indicator tool

- Scaled the deviation between control and impact data in 5 classes
- Sampling effort based
- Evaluate benthic parameters: density, biomass, number of species, similarity (species composition) www.beqi.eu

#### **JEASURING IMPACT DEGREES: CASE STUDIES**

# Dumping of dredged material (BE)



#### **Organic enrichment (Lake Veere, NL)**



## Alien species (Ensis directus) (NL coast)



0 2000000 400000 600000 8000000 1000000 12000000 Dumping quantity (Tonnes Dry Matter) per year G., Hostens, K., Parmentier, K., Robbens, J., Bekaert, K., De Backer, A., Derweduwen, ewaert, H., Hoffman, S., Pecceu, E., Vandendriessche, S., Wittoeck, J., 2010. Biological

Evaluation of the impact at 5 dredge disposal sites (2006-2008) in Belgian Coastal waters
> Benthic community impacted (EQR < 0.6) from a dumping intensity of 1 to 2 million tones dry matter per year</li>

Impact strongest on the parameter density

Number of species less impacted

Chronic dumping prevent the development

of a **healthy, stable** benthic community

Ecological status in Lake Veere bad, mainly in the deepest habitat (< 8m) due to oxygen depletion as a consequence of eutrophication and stratification

Restoration measures

Management action: again water exchange through inlet in Oosterschelde dam
 Benthos recovery in deepest habitat
 Other habitats still affected, partly due to changed salinity patterns



gen Due to the dominance of *Ensis directus* in fine
 sandy sediments at Wadden Coast (2002-2004):
 > Benthos species composition changed
 → Similarity EQR moderate
 > Biomass quadrupled in last 10 years
 t → Biomass EQR bad
 > Number of species slightly decreased

 $\rightarrow$  Number of species EQR moderate

The need for adequate control/reference areas

Sampling strategy spatially and temporally adapted to impact type

**Impact assessment: Points of attention !!** 

Biological assessment has to coincide with detailed knowledge on impact frequency and intensity

Indicators summarize patterns, but they do not provide full explanations of observed patterns

## CONCLUSION

> Indicators are evidence based tools which can be used for the evaluation of anthropogenic impacts in marine systems.

> The BEQI indicator tool is capable of measuring the impact degree of different pressure types. The different BEQI parameters

combined in the tool, however, may react differently (the degree of impact) on exerted pressures.

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