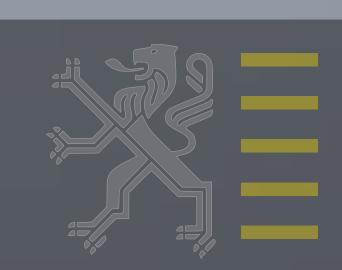
How To Measure The Impact Degree Of Different Anthropogenic Pressures?



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EU Framework Directives (marine environment)

- Water Framework Directive
- Marine Strategy Directive
- Habitat and Bird Directives



Healthy ecosystems where human influences are well-managed

Evaluation of the

- Impact assessment
- Physical disturbance (fisheries, sand extraction, dredging)

environment

- Pollution (chemicals, nutrients)
- Construction works (wind farms, harbours, coastal defense)
- Recovery assessment

High

Good

Moderate

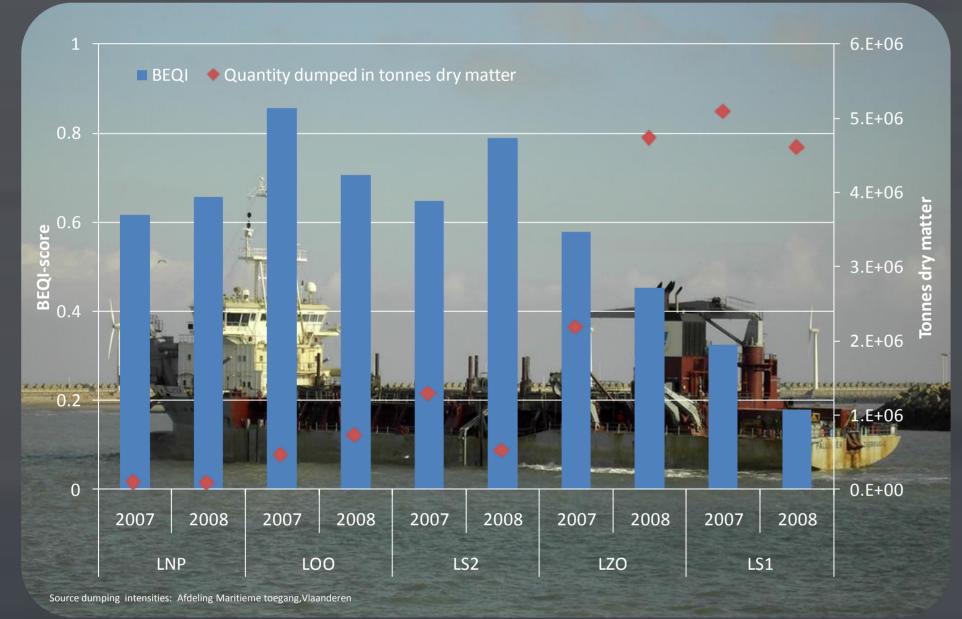
Benthic Ecosystem Quality index (BEQI)

- Multi pressure tool
- Habitat approach
- Sampling effort based
- Control/reference reflects natural dynamics
- Confidence levels
- Flexible

www.begi.eu

MEASURING IMPACT DEGREES: CASE STUDIES

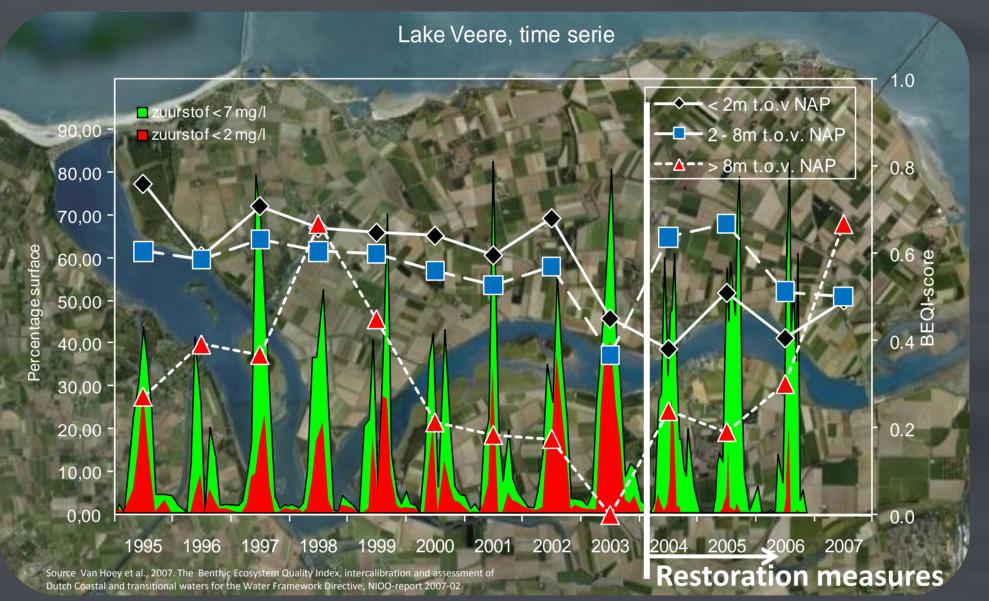
Dumping of dredged material (Belgium)



Impact on benthos when BEQI < 0.6

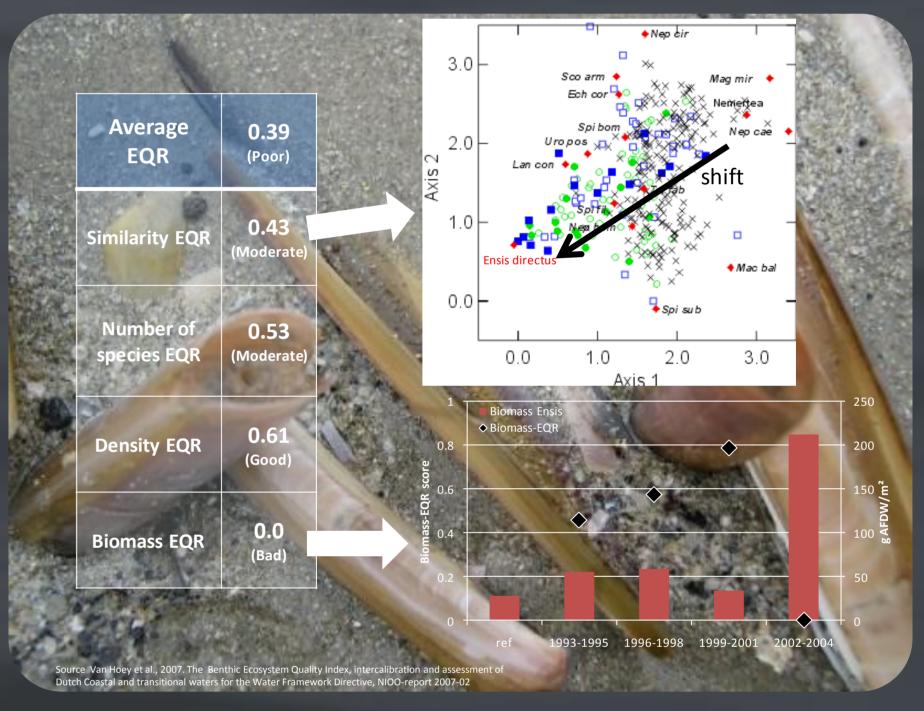
- ➤ Dumping site **Zeebrugge Oost**: sandy mud habitat & high dumping intenstiy
 - benthos slightly impacted
- Dumping site **LS1**: heterogeneous muddy-sand habitat & very high dumping intensity
 - benthos impacted
- Other sites with lower dumping intensities not impacted

Organic enrichment (Lake Veere, NL)



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

Alien species (Ensis directus) (NL coast)



Due to the dominance of *Ensis directus*:

- ➤ Benthos species composition changed
 - → Similarity EQR moderate
- ➤ Biomass quadrupled in last 10 years
 - → Biomass EQR bad
- > Number of species slightly decreased
 - → Number of species EQR moderate.

The need for adequate control/reference areas, free of impact

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

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

CONCLUSION

- > Biotic indices are evidence based tools which can be used for the management of human impacts in marine systems
- > Comparison of impact degrees by means of biotic indices is possible, provided that enough scientifc information is available.

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