

The sensitivity of soft-sediment habitats to dredged material dumping

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Introduction: The effect on the soft-bottom fauna by the dumping of dredged material can be direct, such as burial of organisms immediately after a dumping event (cf. foraging capacity, mobility) [1], or can be indirect, such as habitat alteration as a result of deviating sediment properties of the dumped material (e.g. mud content, median grain size).

Substantial dredging activities take place in the navigation channels and Belgian harbours throughout the year and the dredged material is disposed at 5 designated areas, which were located in three different benthic habitat types. The soft-bottom fauna (macrobenthos, epibenthos and demersal fish) are yearly monitored at those sites. The present study evaluates the difference in sensitivity of those three habitat types, regarding the pressures related to dumping, by means of an indicator tool (BEQI, www.beqi.eu) to quickly assess the degree of change in diversity and productivity of the soft-bottom fauna.

Methods: The assessment of the changes on the benthic habitat was based on a control/impact design monitoring featuring impact stations, border stations and reference stations. The BEQI indicator tool objectively classify the comparability between the group of impact and control samples. If the scores are below 0.6, the characteristics of the impact area deviates too much from what is expected based on the control data.

Results: At the dumping sites, located in the muddy habitat, we observed only minor differences in faunal characteristics, despite the relatively high dumping intensities (Fig. 1a).

Chronic dumping in high amounts ($\pm 5.000.000$ tonnes of dry matter per year) leads to a clear impoverishment of the benthic habitat (lower diversity and densities) in the fine muddy sand habitat (Fig. 1c).

The dumping of dredged material, in relative high amounts in a sandy environment leads to non-consistent changes in the benthic fauna (Fig. 1b). This is related to the appearance of 'mud-loving' species in a sandy environment.

Discussion: Most benthic species can resist limited disposal intensities and are able to recover between

consecutive dumping events [1]. Results of the present study indicate that the diverse fine muddy sand habitat is more sensitive to chronic dumping and more susceptible to changes in habitat characteristics than the less diverse muddy habitat. Therefore, attention has to be paid to the value of the ecosystem and its resilience/recoverability in managing dredged material dumping. Beside it, indicator tools are helpful to quickly assess changes in the ecosystem due to human induced pressures.

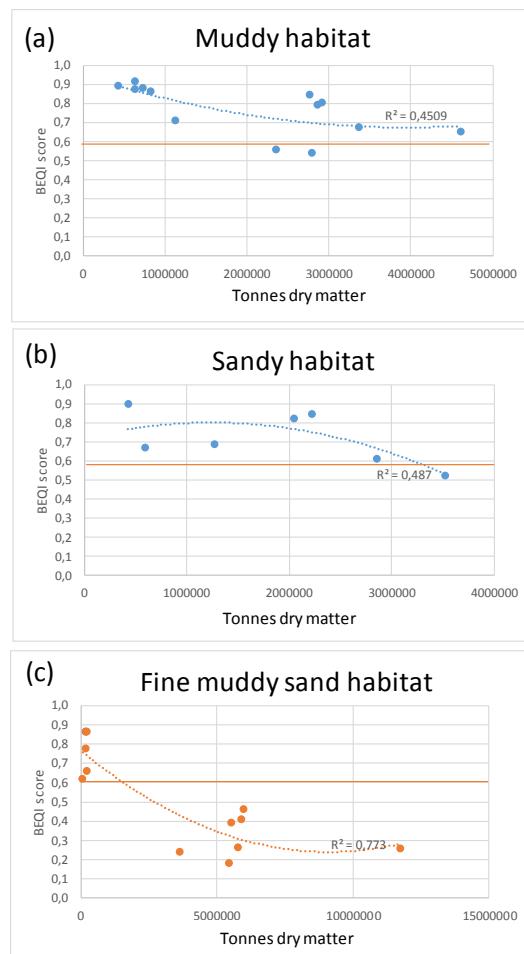


Fig. 1: BEQI average score against dumping intensity for the three habitat types (orange line, threshold of 0.6).

References: [1] Bolam et al. (2011) *Environ Monit Assess* **181**:13-27.