

ECOLOGICAL MONITORING OF THE BEACH NOURISHMENT PROJECT LOMBARDSIJDE

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During the last decade, climate change has become a much debated topic. An increase in storms and rising sea levels are particularly problematic for low lying countries like Belgium. Moreover, every kilometer of our coastline is intensively used and needs protection against coastal erosion and flooding. Despite intensive monitoring and maintenance actions, some parts of our coastline do not achieve the required safety level. Soft coastal defence techniques like beach nourishment might help solve the problem. Beach nourishment consists of mechanically or hydraulically placing sand directly on top of an existing beach. As it safeguards the natural dynamics of the coast, beach nourishment has rapidly become a widely applied protective measure in Europe. However, its effect on the soft-sediment macrobenthos remains unclear. Macrobenthos are classified as the seafloor inhabiting benthic forms larger than one millimeter. These organisms play a key role in the wider beach ecosystem. They make up a large part of the diet of intertidal birds and fish and they act as good indicators of pollution and stress. Our research focuses on Lombardsijde beach as it was nourished from March until September 2009. Approximately 650,000m³ of sand was deposited on top of the beach over a distance of around 1,200m. The sand (grain size: 200-250µm) originated from the new fairway to Oostende.

The scientific evaluation of ecological effects of any anthropogenic influence can only be performed by comparing the status of the environment before (t0 situation) and after (t1 situation) the influence has taken place. The soft substrates of Lombardsijde beach have been and are being extensively monitored (Welvaert, 2005; Van Ginderdeuren *et al.*, 2007; Vanden Eede *et al.*, 2008; Vanden Eede *et al.*, 2010; Vanden Eede *et al.*, 2011, in progress). To distinguish the effects of beach nourishment from those of natural variation, we include reference sites in our studies. These sites have comparable species composition and physical-chemical characteristics to the impact sites but are located out of reach of the investigated anthropogenic influence. The reference site for Lombardsijde beach is the beach in front of Nieuwpoort-Bad.

The 2009 study (Vanden Eede *et al.*, 2010) showed no notable changes on Lombardsijde beach over the period 2006-2009. We did find a rougher median grain size during autumn 2009 compared to previous years. The beach profile of Lombardsijde was altered in such a way that it now resembles the one of Nieuwpoort-Bad almost perfectly. No other distinct negative trends for the macrobenthos were found. The nourishment was in full progress during the 2009 study. A clear overview of the ecological situation after completion of the works (t1 situation) remains to be obtained. Further research is needed to discover the real effects of the Lombardsijde beach nourishment on macrobenthos (Vanden Eede *et al.*, 2011, in progress), especially since the aim of the Flemish government is to declare part of Lombardsijde beach as a nature reserve for both birds and seals.

References

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