

Can we protect our coastline and the beach ecosystem at the same time?

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Whether we like it or not, the climate is changing. An increase in storms and rising sea levels are particularly problematic for low lying countries like Belgium. Every kilometer of our coastline is intensively used and densely populated. Coastal protection against erosion and flooding is as such absolutely indispensable. Soft coastal defence techniques like beach nourishment might help to solve the problem. The word 'nourishment' means supplying a beach with sand because its sand has either flown away with the wind or got washed off with the waves. As it safeguards the natural dynamics of the coast, beach nourishment has rapidly become a widely applied protective measure in Europe. Although beaches are often regarded as barren deserts, nothing can be further from the truth. Underneath the surface lies the world of the benthic organisms. The macrobenthos are the seafloor inhabiting benthic forms larger than one millimeter. They play a key role in the wider beach ecosystem, being part of the diet of intertidal birds and fish.

Our research aims at unravelling the in-situ ecological effects of beach nourishment on the soft-sediment macrobenthos. We focus on Lombardsijde beach as it was nourished from March until September 2009, under optimal conditions. It can be regarded as a prototype of ecological beach nourishment. 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 Ostend. The soft substrates of Lombardsijde beach have been and are being extensively monitored since 2004. Comparing the status of the beach before (t0 situation) and after (t1 situation) the nourishment provides us with the necessary answers. To distinguish the effects of beach nourishment from those of natural variation, we included control sites in our monitoring studies. The control site for Lombardsijde beach is the beach in front of Nieuwpoort-Bad.

We discovered that Lombardsijde beach has changed between 2006 and 2010. Most changes took place during and directly following the nourishment with a clearly visible peak value for abundance (intertidal: 6±1species; subtidal: 16±2species), density (intertidal: 745±247individuals.m⁻²; subtidal: 13125±3597individuals.m⁻²) and biomass (intertidal: 0.7±0.1g.m⁻²; subtidal: 85.2±17.0g.m⁻²) during autumn 2010. Unlike previous years, we also found significant differences between the intertidal median grain size of Lombardsijde and its control site. The beach profile of Lombardsijde was altered in such a way that it resembles the beach profile of Nieuwpoort-Bad almost perfectly. No other distinct negative trends for the macrobenthos were found one year after ecological nourishment.