

The effects of a large-scale shoreface nourishment on the shallow coast epibenthos and fish communities

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Climate change and the expected sea level rise made coastal defence a hot topic in most countries. A 'dynamic' maintenance of the coastline with natural materials, like beach and shoreface nourishment, is often chosen to ensure protection against coastal erosion. Several studies assessed the ecological impact of beach nourishment, especially on macrobenthos. The body of literature on the ecological impact of shoreface nourishment is much smaller, especially when it comes to epibenthos and demersal fish communities of the shallow coastal zone.

In 2010 and 2011, large-scale nourishments on the beach (2 million m³ sand, twice) and the shoreface (4.7Mm³) were undertaken at the outer side of the Ameland Wadden Island (the Netherlands). The shoreface nourishment was performed in an ecological manner, with a construction in different phases and the sediment resembling as closely as possible the natural sediments.

A BACI (Before/After - Control/Impact) design was set up to assess the impact of the shoreface nourishment on the epibenthos and demersal fish fauna. Beam trawl samples were collected in the shallow coastal zone along a depth gradient in autumn, once before the shoreface nourishment and during three consecutive years after suppletion, both in the impact area and an adjacent reference area (Schiermonnikoog Wadden Island).

The shallow coastal epibenthos community was fully dominated by brown shrimp *Crangon crangon*, common swimming crab *Liocarcinus holsatus* and shore crab *Carcinus maenas*. These are characteristic species of a typical coastal epibenthic community, which is adapted to a highly dynamic environment. No significant negative effects could be observed of the shoreface nourishment on the epibenthos community, not even directly after the suppletion took place. The demersal fish community was dominated by lesser pipefish *Syngnathus rostellatus*, gobies *Pomatoschistus* sp. and juvenile plaice *Pleuronectes platessa*. Also, no substantial changes in the demersal fish community were detected, except for a small decrease in juvenile plaice in the impact area.

It can be stated that the ecological approach of the Ameland shoreface nourishment proved to be successful in both safeguarding the coast from coastal erosion and in preserving nature values.