

ARTIFICIAL HARD SUBSTRATES AS ECOSYSTEMS A CASE-STUDY OF THE BELGIAN COAST

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Rocky shores (natural intertidal hard substrates) are known for their high density and especially for their high diversity of marine organisms (e.g. algae, invertebrates, fishes and birds). They are complex ecosystems in which the biological richness results from biotic (predation, competition, grazing) and abiotic (tides, waves, coastal topography) interactions. The majority of the organisms living on rocky shores are restricted to this habitat, forming distinct communities that are significantly different from the surrounding soft substrates (e.g. sandy beaches).

In contrast to the French and English coast, natural rocky shores do not exist in Belgium. Numerous artificial hard structures (e.g. groins, harbour walls and dykes) have however been built within the framework of coastal protection. Along the Belgian coast the typical rocky shore biota can only develop on these structures, thereby increasing the Belgian marine biodiversity. Furthermore, these hard substrates are also important for a number of bird species (e.g. Turnstone (*Arenaria interpres*) and Purple Sandpiper (*Calidris maritima*) as foraging grounds.

A study of the physical characterization of the hard substrates along the Belgian coast has resulted in four types of structures: harbour walls, dykes, groins and piers. Seventeen sites were sampled. Numerous samples were collected at each site where the height above the mean low water spring mark (MLWS) and other physical characters (e.g. substrate type, wave exposure, etc.) were noted. Each sample comprised a quadrat of area 0.25 m² where the % cover and relative abundance of the macrofauna and -algae were ascertained. A total of 91 macrofaunal species and 78 macro-algal species were identified. Most of these organisms are generalist species and widespread throughout North-West Europe.

Differences in biodiversity and density have been found on the various structural types. This can be partly attributed to the various substrates used in the construction of these structures (e.g. sedimentary rock, wood, concrete, etc.), due to their specific physical characteristics (e.g. density, porosity, etc.). Other physical characteristics that appear to be important were geographical orientation, wave-exposure and degree of sand inundation.

The information gained from such a study may provide useful information for the construction of hard substrates along the coast that will not only serve their original function (e.g. sand stabilisation, harbour infrastructure, etc.), but also be ecologically meaningful.