

## **Coastbusters, Nature-based Solutions for sustainable coastal management**

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Coastal zones are under stress of climate change and enhanced anthropogenic pressures. Traditional civil engineering approaches may fall short in efficiently and cost effectively protecting the coast while at the same enhancing the resilience of the coastal zone. In this regard, Nature-based Solutions (NbS) provide additional promising options for coastal managers. Therefore, the public-private Coastbusters consortium investigates the deployment of reef-facilitating infrastructures as a NbS for coastal protection. In this pilot project, a blue mussel (*Mytilus edulis*) biogenic reef is introduced on the foreshore of the sandy Belgian coast. The purpose of this reef is to induce natural accretion and (bio)stabilisation of sediment and enhance (local) biodiversity. It is envisaged that this approach will reinforce the foreshore against coastal storm impact, adding to a more resilient and healthier coastal ecosystem.

To kick-start reef development, an aquaculture hanging system is adapted to initiate a mussel flux from the droppers towards the seabed. Furthermore, the project focusses on developing biodegradable (bio)materials and optimizing the design of the setup to further stimulate reef development. Traditional and innovative environmental monitoring techniques are used to elucidate the underlying processes that drive reef development and understand the effects and boundary conditions. Based on diving footage, Van Veen grabs and Sediment Profile Imaging, sea floor characterization is performed. Furthermore, innovative monitoring techniques are being developed and tested (accelerometers, mooring system with ADCP and sonar-based sensors, robotics, etc.) to obtain a better insight in the highly-dynamic and complex natural processes of growing mussels and biogenic reef development and to evaluate the survivability of the mussel reefs under variable conditions.

The innovative field observations and scientifically underpinned data analysis reveal essential insights to optimize the NbS design. Hence, the current pilot serves as a blueprint to further upscale the Coastbusters-concept, which will lead to future business applications.