What lies beneath the busiest shipping lane of the world? S*tony reefs* in the Belgian Continental Shelf: a quantitative mapping approach.

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Stony reefs, referred to as gravel beds in Belgian waters, and collectively referenced as subtidal natural hard substrate biotopes, promote occupancy by rich benthic communities that provide irreplaceable and fundamental ecosystem functions. Reefs are fragile biotopes and represent a global priority target for environmental stewardship. In predominantly sedimentary seafloors, such as for the Greater North Sea region, their ecological relevance substantially increases given the paucity of foundation species. All inherent European directives and conventions mention reefs in some way. However, scientifically validated methodologies for the quantitative spatial demarcation of reef habitats, accounting for their low resistance and resilience to anthropogenic disturbances, are rare. This study presents a minimally invasive benthic habitat mapping methodology for the monitoring of seafloor integrity under the umbrella of Europe's Marine Strategy Framework Directive (MSFD) (see QR code). For a 32 km^2 offshore study site, high-resolution (1 m) multibeam echosounder (MBES) data and optical images by an underwater video drop-frame were acquired, analysed to quantitatively characterise the reefs, and integrated to produce a random forest spatial model, used to predict the continuous surficial distribution of the coarse substrate grain size fraction (% / 1 m^2) with the highest potential for colonisation by sessile epilithic organisms.
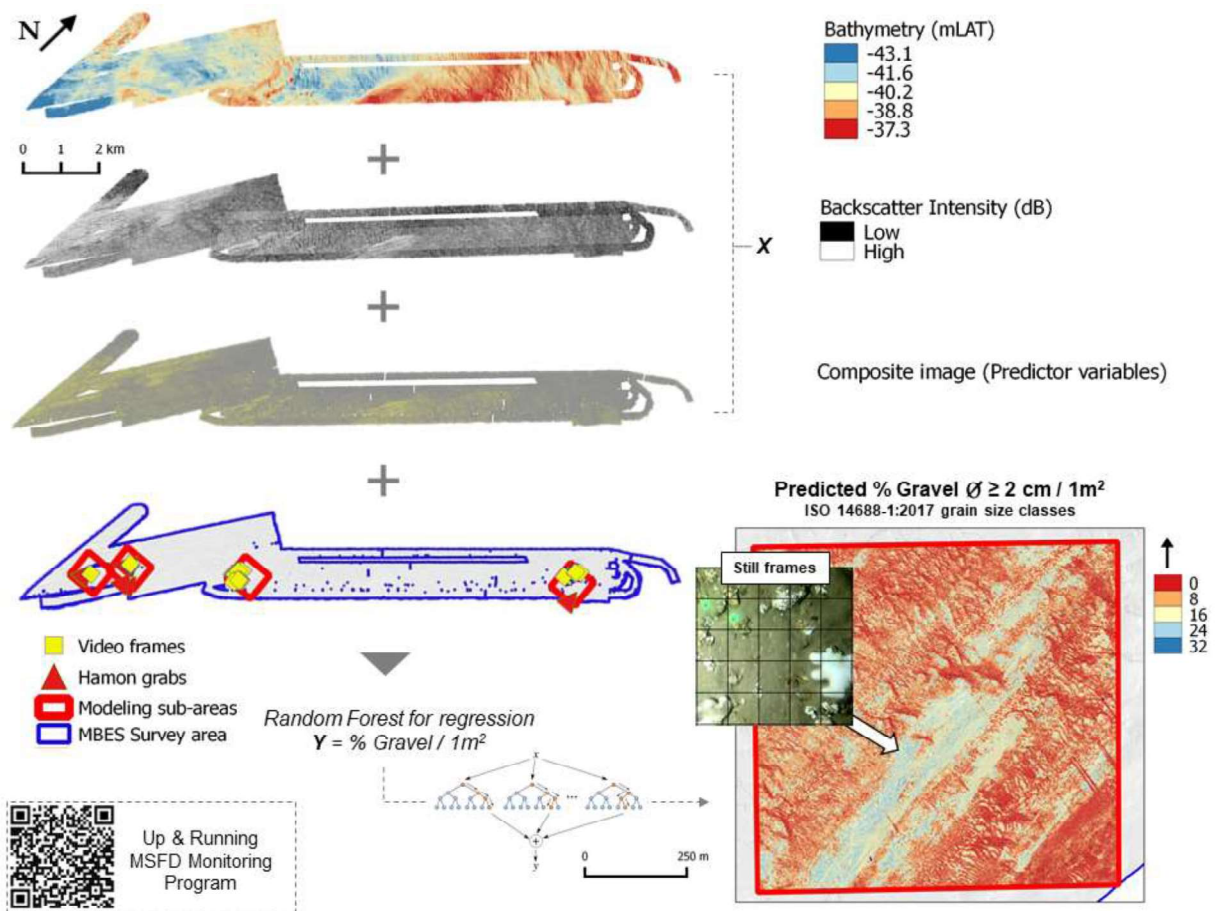

Figure 1 – Schematic diagram illustrating the benthic habitat mapping methodology.