Viability of autonomous underwater vehicles for monitoring of mussel dropper lines in a high energy shallow water environment

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Low elevation coastal zones are under increasing threat from sea level rise and the increasing frequency of other coastal hazards. Nature-based coastal protection is emerging as a viable, resilient alternative to expensive and unstainable hard structures such as sea walls. Effective monitoring of these nature-based solutions is crucial to understanding their ecological and structural health, but some techniques can be time intensive and dangerous. The use of autonomous monitoring techniques is an attractive alternative and becoming more common place as autonomous vehicles become cheaper and easier to use. As part of the Coastbusters 2.0 project, a series of mussel longlines were established in a shallow, high-energy environment on the Belgian coast , aiming to induce a mussel reef. In this setup, we show the use of a Gavia AUV in to monitor mussel longlines and their potential impact on the sea floor using a varietyside scan sonar . The side scan imagery was able to clearly show the mussel longlines and the individual dropper lines in both the mosaics and waterfall images. The surveys provided information on the status of the longlines and showed the mussel dropper lines on the seafloor, implying some mussel growth weighing the longline down. The images also captured significant scouring around the longline anchors and debris on the sea floor. This project shows that autonomous monitoring of mussel longlines in a shallow high-energy environment with an AUV is a viable technique that provides valuable information within the scope of nature-based coastal protection projects.

Keywords
Mussel Reefs; Monitoring; AUV; Side Scan Imagery