

MASTS Small Grant Scheme

Grant Report - SG455: Effects of Noise Playbacks on Sediment Flocculation and Settlement

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Anthropogenic noise is contributing to the acoustic environment of marine habitats more than ever, with increased reliance on shipping and the development and implementation of marine renewables. There now is growing evidence that the increasing levels of man-made noise in the oceans are having negative effects on the organisms that inhabit them. It is however a total unknown whether noise also affects biophysical processes such as sedimentation. When repeating a MASTS funded laboratory experiment (Wale et al. 2019) in the field, we confirmed our initial laboratory results that ship-noise playbacks significantly reduce the filtration rate of the blue mussel *Mytilus edulis*. Unexpectedly, in the noise treatments, we also found a significant reduction in the settlement of sediment compared to the control, where no mussels were present. This exciting preliminary result, if confirmed in the laboratory, would mark a step-change in underwater noise research, expanding the field beyond an organismic perspective regarding responses and effects, with potential for industrial applications.

The £450 I received from the MASTS small student grant was used to fund travel costs, accommodation, and sustenance to visit the University of St Andrews and set up an experiment where the noise-induced changes in sediment turbidity were measured across time and sediment concentration.

These initial experiments did not identify any effect of a 100Hz pure tone on the sediment settlement of either Kaolin or natural sediment. Across all concentrations tested, the settlement rate remained consistent under both noise exposure and control conditions. Despite this result, there are a number of future avenues of research to pursue. Firstly, these preliminary experiments only utilised a single frequency and intensity of noise exposure and further work is needed to investigate if different frequencies produce the effect observed in the previous field study. Secondly, exploration of how these varying frequencies affect different sediment types and concentrations should be explored.