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# Assessing ecosystem effects of changes to man-made infrastructure in the North Sea

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The north sea is a highly productive area, both biologically and for a variety of economic activities. It is also undergoing great change; anthropogenic usage is changing with Oil and gas activities ramping down whilst offshore wind installations are increasing, all against the increasing impact of climate change. For oil and gas structures there is an active debate as to the positive or negative ecosystem effects of different decommissioning strategies for structures (e.g. removal, toppling). Whilst the effect of different options have been extensively studied at the level of individual structures, it is necessary to consider them in a basin wide context and in combination with the effect of other contemporary pressures.

Here we use coupled physics-biogeochemistry models (GOTM-ERSEM, FVCOM-ERSEM and FVCOM-PyLAG with specific adaptions for man-made structures to understand the possible scope and magnitude of effects on the north sea ecosystem for different decommissioning scenarios of oil and gas structures (removal, toppling, leaving intact). Specifically we look at the utilisation of structures by colonising organisms, the effects of trawling exclusion, and changes to connectivity. We also consider these with the addition of other man made structures (shipwrecks and wind farms) and under a future climate scenario.