

TRAWLING REEFS: IMPACTS OF HABITAT MODIFICATION

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Habitat complexity and heterogeneity influence the faunal abundance, species richness and species composition of invertebrate and fish communities. The provision of shelter and food are most often mentioned as important mechanisms to explain this influence. Present study focuses on the biogenic habitat that is created by the tubeworm *Lanice conchilega* in soft bottom environments. Analyses of macrofaunal long-term data from a shallow fine-sediment bottom show a positive correlation between steadily increasing macrobenthic densities and densities of this tube dwelling polychaete ($R=0.59$; $p<0.001$). The study demonstrates that some dominant species are strongly dependent on *L. conchilega*. This tube-builder is clearly able to shape the community composition by expanding the realized niche of species that otherwise occur in low densities (i.e. the ecosystem engineer generates the so-called Babuchka-like community pattern). In situ measurements of *L. conchilega* aggregations (e.g. elevation $p<0.0001$) allowed qualifying them as reefs (according to the definition of the EU Habitats Directive). Moreover, this particular ecosystem-engineer is used as a proxy to test beam-trawl impacts on soft-bottom habitats in the North Sea. During mesocosm experiments, different beam trawl regimes were simulated in dense *L. conchilega* patches. Mortality was significantly higher for all regimes as compared to the controlled area, but only after several subsequent beam-trawl passages; *L. conchilega* is thus relatively resistant to fishing pressure. However, an intertidal one-off experimental trawling showed significant community impacts ($p=0.001$), due to the response of highly dominant species. Furthermore, the food and shelter function of these reefs for different flatfish species is being investigated. An *in situ* experiment was set up to test whether juvenile Plaice (*Pleuronectes platessa*) actively selects for *L. conchilega* reefs. These results are confronted with the results on beam trawl impact on the *L. conchilega* reefs. We conclude that beam trawl passage significantly changes a preferred habitat of commercially important flatfish species. The presented work characterizes relationships in benthic biodiversity and ecosystem functions while it also improves our capacity to assess the consequences of anthropogenic threats to the marine environment.