

Project PREMISE



Risks for the marine environment (WP3)

Assessing risk is about assessing the most sensitive species. In this task, benthic organisms such as the Lugworm (*Arenicola marina*) and Brittle stars (*Amphiura filiformis*), which are known to be sensitive to various pollutants, are collected from the Danish marine environment and exposed to microplastics from wind turbines. The organisms are exposed to virgin plastics as well as plastics which have undergone controlled aging, and the impact assessed based on both on an acute and chronic endpoint, such as mortality, behavior, and growth. Both the lugworm and brittle stars are keystone species essential for Danish coastal ecosystems and are also known to be among sensitive to pollutants.

- **Task 3.1.** Experiments with the lugworm. Lugworms are deposit feeding and process large amounts of sediment during their feeding. This bioturbation activity irrigates the sediment and plays a significant role in oxidating the top layer of the sediment, which again is a prerequisite for a high biodiversity in the sediment. Apart from this key function, *A. marina* is furthermore an important food source for pelagic fish such as the Cod. This implies that impact on lugworms can cause cascading effects on the benthic ecosystem and any plastic accumulated in the tissue of lugworms could potentially be transferred to fish preying on the worms.
- **Task 3.2.** Assessing effects on Brittlestars. *A. filiformis* is a sediment dwelling echinoderm, which constitute a significant portion of the benthic invertebrate biomass in Danish coastal waters. It can both feed on sediment and suspended particles. It places itself with the body buried in the sediment and the arms extended into the overlaying water. *A. filiformis* arms is a very important food source for fish such as Plaice. As with other Echinoderms *A. filiformis* has strong regenerative abilities and can typically regenerate their arms with any chronic implications. However, studies have shown that the regeneration of arms can be a very sensitive endpoint for assessing impact of pollutants and might thus serve as an important endpoint for risk assessment of plastic pollution.

Expected results: Evaluation of microplastic risks for most sensitive species, and by large, for marine organisms.

Milestones:

- M3.1. Evaluation of impact of virgin and aged plastics on benthic organisms (lugworm) and top layer of sediment (RUC, M24)
- M3.2 Effect of plastics on Brittle stars and benthic invertebrate biomass in Danish coastal waters (RUC, M30)

Deliverables:

- D3.1. Report on experimental results (RUC, M15)
- D2.2. Two scientific articles on impact of wind turbine plastic on benthic species (RUC, M22)

