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Artificial Floating Wetlands (AFW) provide manifold ecosystem services, e.g. the uptake of nutrients through biomass production and harvest, the attenuation of wave energy and the provision of sheltered habitats for aquatic fauna within the rhizome network (Karstens et al. 2021)

Habitat for birds and insects

Usable biomass – bioeconomic value

Increase in attractiveness

Nutrient removal through harvest

Removal of pollutants



Attenuation of currents (increase of sedimentation)

Protection for juvenile fishes

## Pre-cultivated plant mats

The following materials were tested as plant substrates: coconut fibre, and as regional alternatives hemp fibre and sea grass.

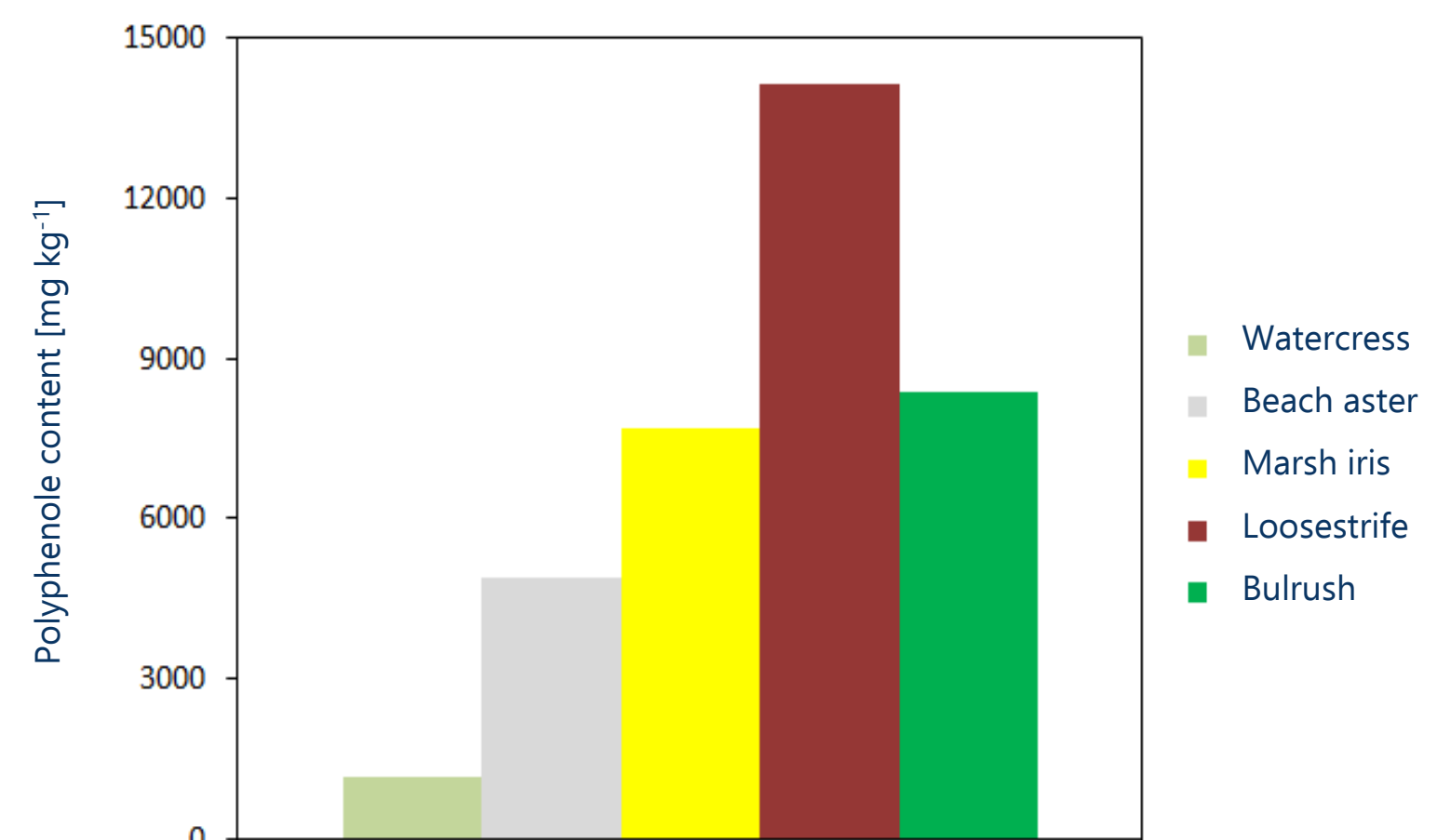
Preliminary results from 2022 show that plant growth and survival rates were best on coconut fibre. Although sea grass worked well in the trials at the Kieler Meeresfarm, plant growth was not sufficient on AFW in Rostock. Further substrates will be tested in the vegetation period 2023.

## AFWs in coastal areas

Building on the results from the EU South Baltic Project LiveLagoons, where for the first time AFWs constructed of sustainable materials, free of artificial polymers, were tested in coastal waters, our work in the project BaMS HaFF focusses on

- further improvement of the AFW construction and design;
- trials of different substrates: coconut fibre, hemp fibre, sea grass;
- monitoring of plant survival rate and biomass production;
- analysis of polyphenol content and antioxidative capacity of the plants as indicators for phytochemical health protective effects;
- research on use and processing of harvested medicinal plants and herbs.

## Polyphenole contents in selected plant species



Polyphenole analysis of the harvested plants (July 2021) shows highest values in Loosestrife (*Lythrum salicaria*, 14,000 mg kg<sup>-1</sup>), followed by Bulrush (*Schoenoplectus lacustris*) and Yellow flag (*Iris pseudocorus*).

## AFW design 1

- Construction: Thermowood
- Pro: Pre-cultivated plant mats (substrate) easy to attach
- Con: root growth only possible along the gaps, Barnacle overgrowth decreases buoyancy



## AFW design 2

- Construction: glass gravel in basalt net with xylitol fiber
- Pro: Better root growth, sufficient buoyancy
- Con: substrate attachment needs improvement



Reference: Karstens, S. et al. (2021): Constructed floating wetlands made of natural materials as habitats in eutrophicated coastal lagoons in the Southern Baltic Sea. J Coast Conserv 25, 44

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