

 ECOGEOMORPHOLOGY

Plants and dune dynamics

Foredunes shield coastal environments from storms and waves, and vegetation impacts storm response and evolution through complex ecomorphological feedbacks. However, the mechanisms by which plants influence the formation of nebkha (mounded precursors to larger dune formation) are little understood despite their importance in coastal protection.

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USA, and colleagues tested the impact of three plant species on nebkha formation to better understand the role of vegetation on dune development. Plant boxes, each with either a sedge or one of two erect grasses, were established at various densities and configurations. After 30 minutes in a wind tunnel, nebkha topography was measured relative to plant morphology. Although plant density did not impact nebkha formation, nebkha

size increased with plant size, and reflected plant morphology: the sedge produced circular nebkha whereas the grasses created oblong nebkha. Moreover, planting arrangement, relative to wind direction, significantly impacted the size of the accreted nebkha. These results were consistent with complementary fieldwork conducted along the backshore of a beach in New Jersey, USA.

Sea level rise and climate change will continue to impact coastal environments, making understanding dune dynamics necessary. Specifically, understanding the complex ecogeomorphic interactions underpinning the ability of plants to act as ecosystem engineers is key to better forecasting, planning, and management of dune habitats.

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Credit: Sebastian Doerken/Getty Images

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