

# Squeezing out dune plants

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Researchers from Texas A&M University created a model to better understand the impacts of development and coastal erosion on plant communities, including plants that grow in the ever-shrinking strip of habitat between land and the ocean. Rusty Feagin, Douglas Sherman, and William Grant simulated varying levels of sea-level rise to understand the effects of erosion and development on sand dune plants. Their research appears in the September issue of *Frontiers in Ecology and the Environment*.

In most circumstances, as coastlines erode, plant communities are displaced away from the ocean, unless blocked by a barrier, such as a cliff. In areas like Galveston Island, natural cliffs are not the issue, but development and non-native lawns block the plants' migration.

Creating models to explore low, medium, and high increases in sea levels for Galveston Island, Feagin and colleagues found that the combination of human-created barriers and sea level rise trapped plants in a small zone, altering the plant population as well as the dune structure.

Larger, sturdier plants – late-succession species – are the most important to preserve, yet these are the most likely species to be lost. These plants are critical in the formation of dunes, binding sediments, and reducing erosion, both in the long term and during events such as hurricanes. They also provide critical habitat for endangered animals such as the Kemp's ridley sea turtle (*Lepidochelys kempii*).

According to the scientists, in a low sea-rise scenario, plant communities

fully developed over five years, but in cases of moderate and high sea level rise, plant communities were too stressed to grow in many areas, leading to smaller dunes and an eventual breakdown of dune formation. In the higher water scenarios, the plant populations no longer provided windblocks, elevated dune structures, or added to the sand and soil fertility.

On Galveston Island, "the loss of such species is already occurring, where sea oats (*Uniola paniculata*) have disappeared due to a combination of human-induced disturbance and climate change," say the researchers.

All this means faster erosion and less protection for the people, animals, and buildings on Galveston Island.

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