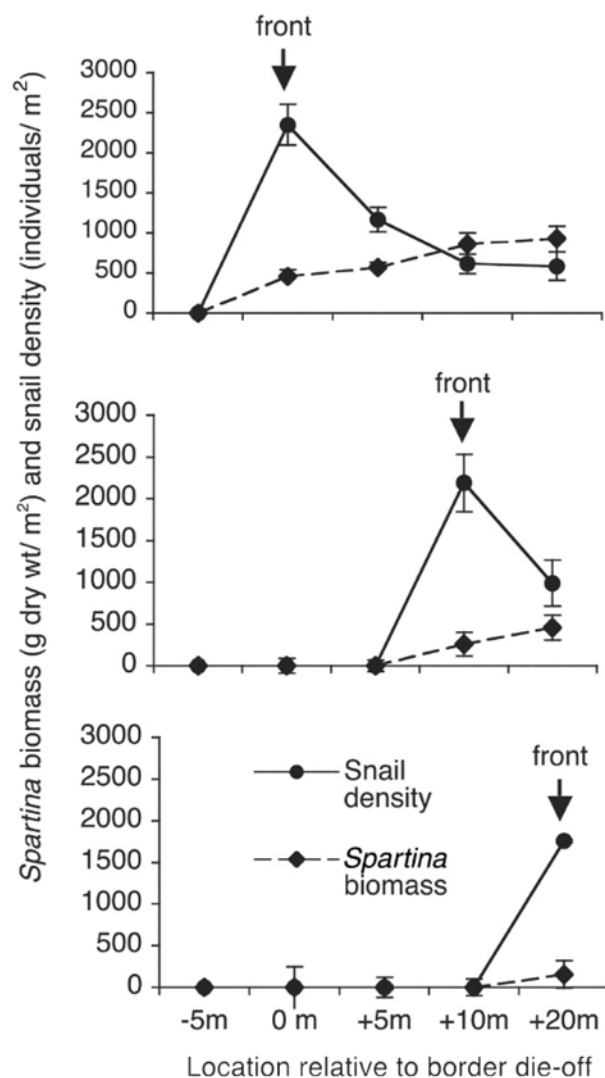




## Snail Fronts and Salt Marsh Die-Offs



**Caption:** The density of periwinkle snails (*Littoraria sp.*) and biomass of cordgrass (*Spartina sp.*) in a Georgia salt marsh at three time points: the beginning of the study (top), after 6 months (middle), and after 12 months (bottom). Zero meters (0 m) on the x-axis marks the original boundary (at the beginning of the study) between a vegetated salt marsh and a barren mudflat. Negative distances indicate locations toward the interior of the mudflat. Positive distances indicate locations toward the vegetated salt marsh.

### BACKGROUND INFORMATION

Coastal salt marshes carry out important ecological functions, many of which enhance the economies of local communities. Salt marshes are incredible fish factories and support world-renowned shrimp, oyster, and finfish industries. Marshes also act as natural sea walls, dampening incoming waves as well as reducing storm surge. Finally, they are pollution sponges; they soak up carbon from the atmosphere as well as land-derived nutrients that would otherwise cause harmful algal blooms. In the last 100 years, the U.S. has lost ~25% of its coastal salt marshes due to changes in food webs, land use, and climate.

Researchers have studied how physical disturbances to salt marsh ecosystems can alter soil characteristics, such as drought and nutrient availability, which can cause die-offs of cordgrass. But less is known about how cordgrass grazers like the periwinkle snail influence salt marsh ecosystems that are stressed by drought. Under normal conditions, the periwinkle snail indirectly regulates cordgrass growth by facilitating fungal infection from scraping the plant's leaves, creating a wound for fungus to grow; essentially farming the fungus that it later eats. During times of drought, snail grazing on drought-stressed plants intensifies and grass dies in localized areas, forming bare patches called mudflats. Once the grass dies in this area, snails always move across the mudflat toward healthier grasses and slow down once they find live grass. As a result, periwinkle densities pile up and over time increase along the edges of the mudflats, forming a "snail front." In this study, researchers tracked changes in cordgrass and snail densities after a lengthy period of drought in order to determine whether periwinkle snail fronts expand mudflats and contribute to salt marsh die-offs.