



RELATIVE IMPACTS OF EUTROPHICATION AND CONSUMERS ON SHORELINE STABILITY IN A SALT MARSH

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Salt marshes are highly productive areas that provide important ecosystem services such as storm protection for coastal areas, nutrient removal and carbon sequestration. Salt marshes losses have accelerated in recent decades worldwide. The objective of this study was to investigate the role of eutrophication and consumers on shoreline stability in a salt marsh through answer research questions like “Are crabs promoting marsh edge erosion? What is the relative importance of nutrient enrichment and crab herbivory on saltmarsh edge erosion? Which geotechnical parameters of the marsh sediment do crabs alter? Can crabs indirectly affect marsh edge erosion by affecting belowground biomass of *Spartina alterniflora*?” here we present data from a series of surveys and two manipulative experiment to (i) evaluate the effects of nutrient enrichment and herbivory, by the crab *Neohelice granulata*, on the dynamics of *S. alterniflora* stems and belowground biomass nutrient-enrichment experiment and the (ii) impacts of crab on shoreline erosion on marsh edges. The nutrient enrichment experiment consisted of a fully factorial design (2x2; n=8) with the following treatments: (i) with herbivory (controls) (ii) with herbivory and nutrient addition (iii) without herbivory and with nutrient addition (exclosures 75x75 cm), (iv) without herbivory and without nutrient addition, (v) controls for cage effects (exclosures with three sides instead of four). The experiment was deployed from september 2017 to abril 2019. Nutrient additions consisted of doses of 60 g of a slow-release pelletized fertilizer (29% N, 5% P, and 5% K) per plot per month. The results showed an increased above-ground leaf biomass when the nutrient load increases, in conjunction with the predatory pressure, measured as percentage of bitten leaf. The number of crab burrows was also higher with nutrient addition, being the below-ground biomass lower in the enrichment treatments. Our study reveals that nutrient enrichment, as a measure of eutrophication, decrease the stabilizing effects of salt marshes plants due a lower belowground values detected. The nutrient enrichment decreases the aboveground/belowground ratio, reducing the stability of the sediment aggregates. These effects are potentiated by the activity of burrowing crabs, thus accelerating the erosion risk of salt marshes edges.

Keywords: *Nutrient enrichment; eutrophication; salt marshes; Spartina alterniflora; Neohelice granulata*