Devine, Amanda (2003). "Effects of Inorganic Nitrogen Addition and Elevation Change on Species Evenness and Productivity of Saltmarsh Forb Pannes". Standard Theses.

This study examines the response of productivity and species evenness of forb pannes in the Sprague River Salt Marsh, Phippsburg, ME, to a two-factorial manipulation of soil waterlogging and nitrogen availability. These factors occur along gradients and play a critical role in determining species composition. Experimental plots are either raised or lowered from ground level in order to decrease or increase waterlogging, respectively, in conjunction with one of two levels of nitrogen fertilization. Previous studies show that addition of limiting resources leads to an increase in productivity and concomitant decline in species evenness as intensity of inter-plant competition for light is heightened.

I hypothesized that (1) fertilization would result in a significant increase in productivity and decline in evenness in areas which remained at or which were elevated above ground level. As nitrogen mineralization in waterlogged soils is hindered by the absence of aerobic microbial action, I anticipated that lowering plots would diminish the effects of fertilization noted in control and raised plots. I further hypothesized that (2) since the ambient effects of waterlogging experience by ground level plots would be less significant in raised plots, raised plots would experience declines in evenness and increases in productivity more so than ground level plots.

Results revealed that there was no significant interaction between fertilization and elevation treatments. Fertilization resulted in a significant loss of species diversity and evenness and a significant increase in total biomass irrespective of plot elevation. Raising plots also led to a significant decline in evenness while lowering plots had no significant effect. Elevation change had no net effect on total biomass of plots. Based on the dramatic response of the disturbance colonizer *Salicornia europaea* in raised and lowered fertilized plots, I conclude that elevation change functioned as a disturbance event rather than as an agent of waterlogging change. This conclusion is also supported by my inability to measure oxidation-reduction potential (E_h) and collect pore water, suggesting soils were not saturated for prolonged periods.