West Falmouth Harbor, an estuary located on Buzzards Bay near Cape Cod, is a site containing both seagrass ecosystems that are known to have suffered from nitrogen loading due to runoff from a now-abandoned wastewater treatment plant, as well as ecosystems that remain relatively untouched, protected from the effects of nitrogen loading (Havn et al., 2014). In this study, data is presented to support the hypothesis that an increase of nutrient pollution in seagrass ecosystems will decrease the population of the local infauna and epifauna as well as the resident plant life. Previous data taken over the past 20 years from West Falmouth Harbor displayed higher than average levels of nitrogen, a sign that excessive nitrogen loading and nutrient pollution has occurred in the inner Snug Harbor as opposed to the more protected Outer Harbor which contained relatively normal amounts of nitrogen (Hayn et al., 2014). After data collection and analysis during the summer months of 2024, it is reported that the populations of various taxonomic groups of infauna (sediment dwelling) and epifauna (surface dwelling) organisms were drastically lower in areas where nitrogen pollution was known to be higher (Snug Harbor) as opposed to areas where nitrogen loading was known to be lower comparatively (Outer Harbor). These results suggest that nitrogen loading has an effect across all levels of seagrass ecosystems, rather than only affecting the photosynthetic organisms in these ecosystems.