Health of the Laguna Madre Watershed Year 4: Study on the Efficacy of Mitigation Concepts Utilizing Phytoremediation

Pena, Christian (School: Homer Hanna High School)
Cornejo, Sofia (School: Homer Hanna High School)

The health of a watershed is multifaceted, encompassing physical, chemical, and biological aspects. In the Laguna Madre Watershed, significant landscape shifts have occurred, including the introduction of an oil pipeline, expansion of the space industry, planned dredging for a second causeway, and proposed land clearing along feeder rivers. These alterations historically correlate with increased sedimentation runoff, biomass loss, heightened carbon footprint, plastic waste, and excess nutrient loading. Such changes detrimentally impact aquatic life abundance and diversity, as demonstrated in a study on brine shrimp. To address current environmental stressors, mitigation structures combining phytoremediation and structural components were devised. Native plants—aquatic, semi-aquatic, and terrestrial—were selected for their remediation capabilities, while PVC, marine floats, and solar netting were utilized for construction. The design facilitated the capture of microplastic waste, with wetland systems demonstrating a reduction of pollutants over a photosynthetic period. Microbial counts were higher around wetland structures compared to control samples. Furthermore, structural integrity was maintained even in rough wave conditions, showcasing the effectiveness of the approach in mitigating environmental impact.

Awards Won: