



Anthropogenic Disturbances to *Enhalus acoroides* Meadows along the Mannar Causeway, Sri Lanka

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Seagrass ecosystems provide essential ecological services, including habitat provision, coastal stabilization, and fisheries support; however, they are increasingly threatened by localized anthropogenic pressures. This study evaluates the condition of *Enhalus acoroides* meadows along the western coastal margin of the Mannar Causeway, Sri Lanka, with emphasis on mechanical disturbance, pollution stress, and community awareness. A quantitative assessment of seagrass leaf condition (n=500) revealed that freshly cut leaves constituted 82.4%, significantly exceeding naturally senescent leaves 17.6%. Although no comparative control site was available during this preliminary survey, the unusually high occurrence of fresh leaf cuts observed near heavily used anchoring locations suggests a possible association with intense boat activity and propeller disturbance. Field observations further identified severe disturbance levels, with frequent propeller scarring and anchoring-induced sediment disruption. Oil pollution was also evident, with visible films observed on seagrass leaf surfaces during the field survey, suggesting direct disposal of engine waste and contributing to localized water quality degradation. A preliminary socio-ecological survey of 30 fishermen selected, through convenience sampling, indicated that while all respondents (100%) were aware of seagrass presence and its importance for fisheries, only 30% understood the impacts of mechanical damage, and 23.3% recognized pollution-related effects. Notably, 60% of respondents admitted to disposing of oil waste directly into coastal waters. Despite this, 80% expressed willingness to adopt conservation practices if appropriate guidance were provided. The findings demonstrate that *E. acoroides* meadows in the Mannar region are under significant anthropogenic stress, driven by both physical disturbance and behavioral factors. As a future recommendation to improve the study of seagrass leaf condition, additional ecological indicators such as shoot density, percentage cover, biomass, and leaf area index would further strengthen ecosystem health evaluations. This study highlights the urgent need for integrated management strategies combining regulatory measures, pollution control, and targeted awareness programs to ensure the long-term sustainability of seagrass ecosystems and associated fisheries.

Keywords: Anthropogenic pressures, *Enhalus acoroides*, Propeller scarring, Seagrass, Socio-ecological survey