

Coral reef soundscapes of Cebu, Philippines: Initial results and future directions

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The coastal waters around the island of Cebu is a complex mix of ecosystem types, substrate composition, and underwater topography that vary spatially and temporally. Levels of protection, human use patterns, and occurrence of natural disturbances also vary across space. Status of the coastal ecosystems is primarily monitored through visual assessments of abundance, biomass, or percent cover of the dominant producers such as seagrass, algae, and mangrove or of the dominant life forms such corals and fishes. While these can provide measures of changes between monitoring periods, they are unable to trace temporal sequence of changes in community composition and are unable to detect nocturnal or cryptic species. The use of soundscapes to investigate the phenology of community structures from soniferous marine animals remains an underutilized tool in the Philippines. To characterize the spatiotemporal soundscape patterns and factors that may influence such patterns, autonomous underwater recorders are initially deployed in the following coastal habitats in Cebu: a seagrass bed and a reef flat in a marine protected area near a proposed coastal development site and a fore reef in a protected area frequented by divers. Unsupervised machine learning techniques are employed to tagged biological choruses, transient calls, anthropogenic noises in long-duration underwater recordings. Results from these initial efforts will be used to demonstrate to conservation managers, local government leaders, and funding agencies the value of integrating soundscape information in assessment and monitoring plans of marine ecosystems. In the future, the soundscape monitoring works will be expanded to mesophotic reef in the northeastern Philippines and the Tubbataha Reef in the western Philippines. Possibilities of combining soundscapes with other emerging tools will also be explored.

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