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Assessment of Benthic Substrate Categories of Bandaramulla Reef in the Current Scenario

Sooriyabandara H.G.C.R.*, Iroshanie R.G.A.

Department of Oceanography and Marine Geology, University of Ruhuna, Matara, Sri Lanka
**chanakasooriyabandara000@gmail.com*

Abstract

Over the past few decades, Bandaramulla reef provided an enormous volume of ecosystem functions and services to adjacent communities. However, along with the natural threats such as El-Nino events and Tsunami (2004), misuse and overuse of reef resources, mainly illegal mining, turned this pristine intact reef into a patchy degraded one. Although anthropogenic stressors had been lessened recently, reef recovery was quite dull. Persistent baseline data is vital to generate sound management strategies and also to conserve these biological hotspots. Hence, this study focused on assessing how the reef stands after all those adverse events, especially after the most recent 2014-2016 El-Nino event. From January to March 2021, the reef was assessed for benthic cover (using line intercept transect method) and reef fish abundance (underwater visual belt transect method) using 30 m long five transect lines placed perpendicular to the shoreline to cover the entire reef extent. Resultantly, dead corals were the predominant benthic covering category (31.27±4.64%) (mean±SD). Live hard coral cover was recorded as 21.7±3.48%, including 17 coral species representing dominant species such as *Pocillopora damicornis* (4.8±1.06%), *Porites* sp. (2.2±1.49%), *Pavona clavus* (2.13±3.46%), *Leptoria phrygia* (1.93±0.65%), *Acropora* sp. (1.8±0.96%), *Montipora aequituberculata* (1.73±1.04%). Other benthic categories that showed a significant cover were sand (11.43±2.63%), rubble (11.83±0.63%), bleached coral (6.73±1.49%), algae (6.3±1.23%), rock (5.73±0.77%), invertebrates (4.33±1.82%) and others (0.67±1.33%). Encountered fish were classified into 23 families, and four families had notable abundance as Pomacentridae (24.88±3.06%), Acanthuridae (18.07±4.17%), Chaetodontidae (16.47±4.35), Labridae (11.6±4.32%). The reef appeared as non-intact huge dead coral boulder placement where settled on the middle of a sandy-rubble ground. Contribution to reef recovery by *Pocillopora damicornis* was notable as it covered significant benthic cover, especially on top of dead coral cover. However, many anthropogenic stressors were observed including coastal pollution, boat damage, wastewater seepages and sedimentation. Nonetheless, much of the live corals were partially bleached. Notable algae cover was observed, dominated by *Halimeda* spp. The possibility of future coral to algae phase shift. The likelihood of damaging live coral by combining higher rubble cover and wave action was observed as high. The coral plantation on adjacent to the reef was experiencing the same conditions. It is important to note that the reef health of the Bandaramulla reef was below the average flagging the need for proper management strategies to bring the reef back to life.

Keywords: Reef, Benthic cover, Coral, Reef fish, Stressors