The Abundance and Population Health of Common Reef Fish in Protected Marine Reserves Compared to Unprotected Reef Environments, Utilizing Baited Remote Underwater Video (BRUV) Surveys

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Throughout the world's aquatic ecosystems, governments have established marine protected areas (MPAs) to protect sensitive marine environments. This study explored the use of baited remote underwater videos (BRUVs), a new, emerging technology, in assessing the effectiveness of MPAs. BRUVs were used to evaluate differences in species richness between fished and protected reefs. This study also investigated whether there were population differences between barrier reefs and atolls, and how each of these ecosystems might respond to protection afforded by MPAs. Utilizing BRUVs, this study investigated whether there would be measurable differences in population structure of five species of reef fish between MPAs and non-protected sites, and between two habitat types (barrier reef vs atoll). More than 600 BRUV deployments off the coast of Belize spanning 2009-2013 were analyzed in four distinct reef environments: atoll/MPA; barrier reef/MPA; atoll/fished; and barrier reef/fished. The hypothesis was supported by the results, which showed significantly more species richness in the marine protected areas (MPAs) compared to the fished habitats, with the protected atoll having the greatest richness. These results highlight the benefits of protecting these areas from the pressures of fishing, but also illuminate possible differences in types of reefs to target for conservation. Additionally, the utility of the BRUV device as an inexpensive, safe, and reliable marine ecosystem monitoring technology was demonstrated. This information may prove to be invaluable to marine researchers and preservationists who utilize strategic measures when planning how best to protect and preserve our delicate and essential coral reefs.

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