
191-6 - Booth No. 144: DEATH OF A CORAL REFUGIUM IN A WARMING WORLD AND LOOKING FOR SURVIVORS AT CORAL GARDENS REEF, BELIZE



Tuesday, September 24, 2024



8:00 AM - 5:30 PM



Hall D (Anaheim Convention Center)

Booth No. 144

Abstract

In 2020, Coral Gardens, Belize was documented as a *Acropora cervicornis* (Staghorn) coral refugium, against a backdrop of Caribbean-wide decline of this endangered species. Additional studies showed that the largest documented extant Caribbean population of *A. cervicornis* resided at this location, that corals persisted without interruption through the precipitous 1970s-1980s decline seen elsewhere, and that some coral genets were >400 years old. Between June and December 2023, this reef experienced total collapse during the devastating marine heatwave of 2023. Five transects across Coral Gardens were established in 2012 and surveyed annually for 2-dimensional live coral abundance. Each location was photographed in 1 m² quadrats annually, and live coral was identified using Adobe Illustrator, Adobe Lightroom, and MATLAB to quantify average percent live *A. cervicornis* along each transect with time. *A. cervicornis* populations decreased significantly at Coral Gardens between 2012 and 2017 with an average decline across 5 sites of 17.4% per m². The most prolific section of the reef (Site T5) saw a decline of 40.0% during that time, from 58.0 to 18.1% per square meter. However live *A. cervicornis* showed a modest increase between the 2017 low and June 2023. In that period mean live *A. cervicornis* coral increased from 14.4% to 18.9% across all sites, with live coral at T5 increasing from 18.1 to 37.1% per m². Percent live coral plummeted to zero between June 2023 and December 2023 at all 5 sites. In place of coral, turf algae, red and green coralline algae, and macroalgae dominated the spaces devoid of live coral. The question of what happens next to Coral Gardens remains. We attempted to assess the survival of non-acroporid corals at this site by quantifying all other live corals from past years of the study. Initial indications are that while some other species of coral remained in December 2023, total abundance declined from 7.5 to 4.3% at T1. *Porites porites*, *Porites astreoides*, *Millipora* sp., and *Agaricia tenuifolia* were the primary survivors identified. We are also in the process of quantifying the percent bare substrate vs. algal cover and the abundance of urchin herbivores in comparison with past years.

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