

A Decade of Rapid Coral Community Change on the Florida Reef Tract: Insights from NCRMP

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Coral reef ecosystems throughout the Florida Reef Tract have continued to deteriorate in the face of persistent chronic and more frequent acute stressors. Over the past decade, coral mortality on the Florida Reef Tract has been primarily driven by widespread coral disease, particularly Stony Coral Tissue Loss Disease (SCTLD), and repetitive heat stress events. To assess the impact of these stressors, changes in coral community structure and species-specific population structure from 2014 to 2022 were evaluated using coral demographic data from NOAA's National Coral Reef Monitoring Program (NCRMP). NCRMP uses a stratified random sampling design to biennially survey hardbottom coral populations in the Southeast Florida Region, Florida Keys, and Dry Tortugas. Results indicated significant declines in hard coral cover across all regions, with the Florida Keys exhibiting the highest reduction at a >60% loss in scleractinian cover. Disease prevalence remained relatively low across all regions and years, averaging $2.5 \pm 2.2\%$ in prevalence. Notable exceptions to low disease prevalence occurred in 2016 in Southeast Florida (12.7%) and in 2022 in the Dry Tortugas (5.96%), both corresponding with SCTLD introduction to those areas. Despite the generally low overall prevalence, the greatest declines in coral density were observed among species known to be highly susceptible to SCTLD: *Meandrina meandrites* ($88.3 \pm 5.2\%$), *Colpophyllia natans* ($84.3 \pm 6.7\%$), *Pseudodiploria strigosa* ($80.2 \pm 2.0\%$), and *Dichocoenia stokesii* ($74.1 \pm 4.1\%$). In contrast, bleaching was considerably more widespread, with an average prevalence of $19.9 \pm 9.2\%$ across all regions and years. Additionally, coral species that bleached most frequently (*Siderastrea* spp., *Agaricia* spp., *Porites* spp., and *Stephanocoenia intersepta*) experienced the greatest absolute declines in density. These results highlight the impacts of multiple interacting threats: while disease events are reducing the biodiversity and density of susceptible species, persistent and increasingly severe heat stress events are further reducing the resilience and density of remaining species. Together, these stressors continue to reshape coral community dynamics and threaten the long-term stability of reef ecosystems across the Florida Reef Tract.