Background

The 1983-84 mortality of the once-ubiquitous echinoid Diadema antillarum is one of several factors that caused Florida Keys coral reef change. Pre-mortality surveys are limited, but suggest that densities were similar to Caribbean reefs, with shallow fore-reef densities as high as 4+ individuals per m². By 1990, the population was apparently recovering, with densities approaching 1/10 of pre-1983 levels (0.5-0.6 individuals per m²), with a size structure dominated by larger (> 5 cm) individuals. Unfortunately, the population suffered a second mass mortality beginning in April 1991, reducing the population to 1/100th of its pre-1983 level.

Methods

A two-stage stratified random sampling design is used that partitions the Florida Keys sampling domain by cross-shelf habitat type, depth, along- shelf position, and management zone. Four replicate belt transects (15-m x 1-m) are surveyed per site for all urchin species. Surveys yield data on the transect frequency of occurrence, density (no. per m²), and size (test diameter). Excluding the Tortugas region, a total of 1,173 sites were surveyed during 1999-2010 from Fowey Rocks to east of the Marquesas Keys.

Results

More than a decade of urchin surveys indicate that the Diadema antillarum population is recovering, albeit slowly relative to pre-1983 levels. Offshore patch reefs tend to yield the greatest densities and sizes, while back-reef rubble zones are dominated by recently settled recruits. The most notable change in the population is the increase in the mean test diameter and maximum size during the past 11 years, perhaps indicative of greater survivorship in many coral reef habitats.

Conclusions

- Diadema antillarum is slow recovering in the Florida Keys, especially on offshore patch reefs.
- Densities still remain well below pre-1991 and especially pre-1983 levels.
- Recovery of densities to pre-1983 levels could take decades, if not longer, based upon current patterns.
- Herbivorous fishes are probably critical for maintaining low algal standing crop on many reefs.

Acknowledgments


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