

Linkage between the declines in *Porites* coral skeletal growth and a land improvement project on Ishigaki Island, Japan.

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Recent anthropogenic pollution has adversely impacted the physiology of reef-building corals. However, insufficient empirical data on the relationship between coral skeletal growth (calcification rate and skeletal density) and the degree of anthropogenic pollution are available. We conducted an analysis of *Porites* coral growth (N = 6) in the Shiraho Reef at the mouth of the Todoroki River on Ishigaki Island, Japan, over the 52 years from 1958 to 2009. Declines in calcification and skeletal density with no obvious sign of growth cessation or disease occurred in the 1970s-1980s, which coincided with the start of the public land improvement project on Ishigaki Island. The median calcification and skeletal density values were lower after the 1970s-1980s than those before the 1970s-1980s, and these differences were correlated with the degree and type of land use and development. Thus, the nutrient/sediment loads from the Todoroki River, which were related to the degree and type of land use and development, resulted in decreased calcification and skeletal density in the coral. The coral growth after the 1970s-1980s was not related to thermal stress. After the 1970s-1980s, the relationship between coral growth and environmental factors changed, which suggested that the coral physiological responses observed in the 1970s-1980s were related to the land improvement project.

Keywords: coral calcification, coral skeletal density, land improvement project