

Reef fish community mean body size decreases in warmer waters and varies with trophic composition

Amy Coghlan¹, Julia Blanchard¹, Simon Wotherspoon², Rick Stuart-Smith¹, Graham Edgar¹, Neville Barrett¹, and Asta Audzijonyte¹

¹University of Tasmania

²Australian Antarctic Division

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Abstract

Aquatic ectotherms often reach smaller body sizes at higher temperatures. By analysing ~15,000 coastal-reef fish surveys across a 15°C spatial sea surface temperature gradient, we show mean community-level fish length decreased by ~5% for each 1°C warming, equating to a decrease in mean community-level body-length by 50%, or mean weight by 90% from 14-29°C. We further show dominant trophic guild composition shifts from invertivores and piscivores, to herbivores and planktivores, as water temperature increases. By investigating the contribution of trophic-composition to overall community-mean-length, we show ~25% of temperature-related changes could be attributed to trophic-composition at the warmest sites, but close to zero at colder temperatures. Our findings suggest that small changes in temperature will lead to large changes in fish community body sizes, driven both by changes in community trophic composition in warm waters, and by changes to the average body sizes of fish within trophic guilds across all temperatures.

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