

# Parrotfish Size: A Simple yet Useful Alternative Indicator of Fishing Effects on Caribbean Reefs?

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## Abstract

There is great need to identify simple yet reliable indicators of fishing effects within the multi-species, multi-gear, data-poor fisheries of the Caribbean. Here, we investigate links between fishing pressure and three simple fish metrics, i.e. average fish weight (an estimate of average individual fish size), fish density and fish biomass, derived from (1) the parrotfish family, a ubiquitous herbivore family across the Caribbean, and (2) three fish groups of “commercial” carnivores including snappers and groupers, which are widely-used as indicators of fishing effects. We hypothesize that, because most Caribbean reefs are being heavily fished, fish metrics derived from the less vulnerable parrotfish group would exhibit stronger relationships with fishing pressure on today’s Caribbean reefs than those derived from the highly vulnerable commercial fish groups. We used data from 348 Atlantic and Gulf Rapid Reef Assessment (AGRRA) reef-surveys across the Caribbean to assess relationships between two independent indices of fishing pressure (one derived from human population density data, the other from open to fishing versus protected status) and the three fish metrics derived from the four aforementioned fish groups. We found that, although two fish metrics, average parrotfish weight and combined biomass of selected commercial species, were consistently negatively linked to the indices of fishing pressure across the Caribbean, the parrotfish metric consistently outranked the latter in the strength of the relationship, thus supporting our hypothesis. Overall, our study highlights that (assemblage-level) average parrotfish size might be a useful alternative indicator of fishing effects over the typical conditions of most Caribbean shallow reefs: moderate-to-heavy levels of fishing and low abundance of highly valued commercial species.

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