

Global effects of fishing on coral reef herbivores

Photo: Jen Smith

Project Description

Coral reef herbivore enhancement is likely an effective tool for increasing resilience and restoring degraded reefs. However, little is known about the global status of this important group of fishes. Using published and unpublished estimates from reef sites around the world we asked: *what are global baseline estimates of herbivores biomass, abundance and functional group structure at fisheries accessible reefs (FA) and those not accessible to fisheries (NFA)?* We collected 2706 separate estimates of biomass and abundance from 145 locations across 13 regions.

Herbivore Functional Groups



Scrapers and Excavators
Primarily graze turf algae, leave scouring marks on the substratum. Clear space for colonizing CCA and corals.



Grazers and Detritivores
Primarily graze turf algae, without altering the substratum.



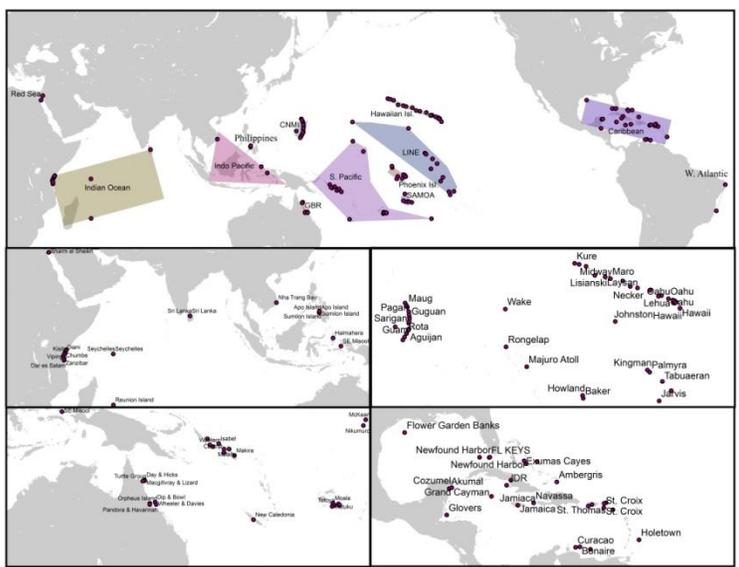
Browsers
Intensely graze fleshy macroalgal species, without altering the substratum.



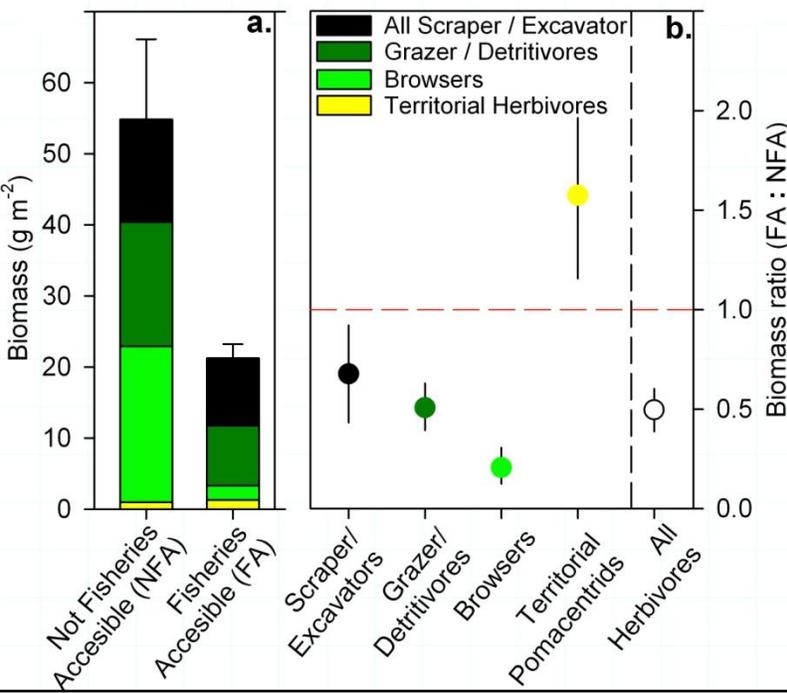
Territorial Farmers (TR)
Maintain small territories, exclude other fishes and cultivate specific palatable algal assemblages. May be associated with declines in reef health.

Results

- 1) Overall and functional group herbivore biomass is much lower in FA areas relative to NFA areas, with greatest declines in the Browser and Scraper / Excavator guilds.
- 2) No differences in numerical density seen aside from increases in abundance of territorial damselfish with fishing
- 4) Results suggest restoration strategies should return herbivore functional groups to proportions observed on NFA reefs in order to be effective.



Above: Map of locations included in the analysis. Below: Mean functional group biomass (a). Vertical bars are ± 1 SE. Bootstrapped mean differences in biomass $g\ m^{-2}$ between FA and NFA locations (b). Lines are 95% quantile-range of differences. Red line represents a mean difference of 0 (no difference in biomass between fished and NFA locations). Circles are medians.



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