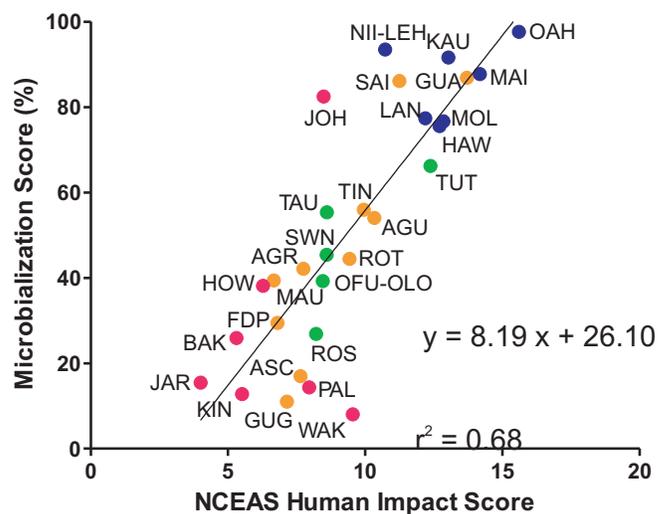
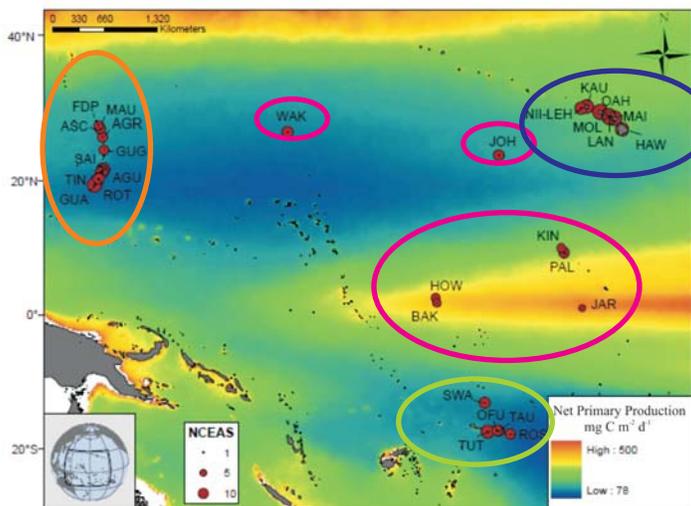


MICROBIALIZATION: THE DISSIPATIVE DYNAMO ON IMPACTED CORAL REEFS

The relationship between increasing human activity and decreasing fish biomass is well-established in coral reef systems. However, the relationship between human activity and microbial activity has not been well quantified in these ecosystems. We and others have previously argued that human activities are favoring the coral reef-associated microbes at the expense of the macrobes, a process called microbialization.

In this study, microbialization refers to an increase in the percentage of the combined fish and microbial predicted metabolic rate that is microbial



We surveyed Pacific coral reefs in four oceanographic regions (99 sites; 29 islands) spanning a range of human impacts (essentially pristine to severely degraded): the Main Hawaiian Islands (blue), Guam and the Mariana Islands (orange), the American Samoa region (green), and the Pacific Remote Island Areas (pink)*. Circles indicate the relative NCEAS cumulative human impact score (<http://www.nceas.ucsb.edu/globalmarine/impacts>) for each island.

Human impact drives microbialization on Pacific coral reefs. Controlling for oceanographic context by including local [chl_a] and rates of NPP derived from satellite data as variables in multiple regression analysis did not improve the fit. The microbialization score reflects both increased microbial biomass and decreased fish biomass; however, microbial biomass has a proportionately greater impact on energy flux.

	<u>Microbes</u>	<u>Fish</u>
Max Biomass Change (g 10 m ³):	1.4	497
Max Metabolic Rate Change (W 10 m ³):	0.08	0.02
Max Fold Change in Metabolic Rate:	100X	14X

* All islands included in this study were surveyed as part of NOAA's Coral Reef Conservation Program <http://www.pifsc.noaa.gov/cred/>

McDole, T. et al. Microbialization of Pacific Coral Reefs. 2012. *PloSOne*, in review.



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