

Title:

Effective governance of reef fisheries requires inclusion of regional socio-ecological networks

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Abstract:

Rocky and coral reefs around the world provide significant local resources for the adjacent human populations. Protecting these resources, in particular fish stocks, for future generations is a strong motivator to establish safeguard measures, such as reserves. However, effective governance of marine resources requires the understanding of the coupled socio-ecological systems at a regional scale. The dependency between the fishers and the fish-consuming populations is critical to the character of the resource exploitation. Here we examined 122 reef systems located around the globe, using fish survey data collected from 1844 sites, across all ocean basins, by the Reef Life Survey program. We used a social network approach to study the linkages created by 499 coastal 'fisher' populations and 1777 associated inland 'consumer' cities. The linkages describing the interactions between reefs, fisher cities and consumer cities were based on linear distances. Our comparison of the underlying topology of the social network to the fish biomass, both inside and outside reserves, indicated that the size and configuration of the social network has influenced the local fish biomass. Our results indicate that effective governance needs to consider total fishing pressure, including, in particular, the consumer demand, at a regional scale in order to be effective in maintaining fish biomass on rocky and coral reefs.

Global SES Network
Blue=Reserves, Green=Fished Reefs
Yellow=Fisher Cities, Red= Consumer Cities

