

## **A framework for adaptive gear and ecosystem-based management in the artisanal coral reef fishery of Papua New Guinea**

T.R. MCCLANAHAN<sup>a,\*</sup> and J.E. CINNER<sup>a,b</sup>

<sup>a</sup>Marine Programs, Wildlife Conservation Society, 2300 Southern Blvd, Bronx, New York 10460, USA  
<sup>b</sup>ARC Centre of Excellence for Coral Reef Studies, James Cook University, Townsville, QLD 4810, Australia

### **ABSTRACT**

1. Artisanal fishing on coral reefs in Papua New Guinea is an important livelihood activity that is managed primarily at the level of local communities. Pockets of overexploitation exist and are expected to increase with plans for increased commercialization.
2. This paper provides a current assessment of the artisanal multi-species coral reef fishery by examining selectivity of the dominant gear, namely line fishing, spearguns, and gill nets. Each gear has its own strengths and weaknesses in terms of use and conservation of resources, with no clear problem gear.
3. The three gears utilize different resources but there was moderate overlap in the species caught, particularly between gill nets and line fishing and marginally between lines and spearguns. Gill nets have the disadvantage of being destructive to coral and the advantage of catching commercial species. Line fishing catches an intermediate number of species but mostly large-bodied and predatory species that could potentially reduce predation and the mean trophic level of the fishery. Spearguns catch the highest numbers of species, including many non-commercial and herbivorous fish and could reduce the diversity of fish and encourage algal growth.
4. This information could be used in combination with scientific monitoring and traditional ecological knowledge to develop an adaptive management framework that uses local restrictions on the various gears to restore or balance the fishery and ecosystem. Restrictions could be selectively imposed: on gill nets when coral cover is low, line fishing when large-bodied predators are depleted, and spearguns when biodiversity is reduced and algal abundance high.

Copyright # 2008 John Wiley & Sons, Ltd.

Received 23 August 2006; Revised 10 April 2007; Accepted 30 April 2007

\*Correspondence to: Dr Tim McClanahan, Kibaki Flats No.12, Bamburi, Kenyatta Beach, PO Box 99470, Mombasa, Kenya, 80107.

E-mail: [tmccclanahan@wcs.org](mailto:tmccclanahan@wcs.org)

Copyright # 2008 John Wiley & Sons, Ltd.

**Goto the AQUATIC CONSERVATION: MARINE AND FRESHWATER ECOSYSTEMS Journal for access to the full article ([www.interscience.wiley.com](http://www.interscience.wiley.com))**

